E 3510-22-P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RTID 0648-XB329

Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to the Relocation of the Port of Alaska's South Floating Dock, Anchorage, Alaska.

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notice; issuance of an incidental harassment authorization.

SUMMARY: In accordance with the regulations implementing the Marine Mammal Protection Act (MMPA) as amended, notification is given that NMFS has issued an incidental harassment authorization (IHA) to the Port of Alaska (POA) to incidentally harass, by Level B harassment and Level A harassment, marine mammals during pile driving associated with the relocation of the POA's South Floating Dock (SFD) within Knik Arm, in upper Cook Inlet, Alaska.

DATES: This Authorization is effective from August 27, 2021 through August 26, 2022.

FOR FURTHER INFORMATION CONTACT: Reny Tyson Moore, Office of Protected Resources, NMFS, (301) 427-8401. Electronic copies of the application and supporting documents, as well as a list of the references cited in this document, may be obtained online at: *https://www.fisheries.noaa.gov/permit/incidental-take-authorizations-under-marine-mammal-protection-act*. In case of problems accessing these documents, please call the contact listed above.

SUPPLEMENTARY INFORMATION:

Background

The MMPA prohibits the "take" of marine mammals, with certain exceptions. Sections 101(a)(5)(A) and (D) of the MMPA (16 U.S.C. 1361 *et seq*.) direct the Secretary of Commerce (as delegated to NMFS) to allow, upon request, the incidental, but not intentional, taking of small numbers of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region if certain findings are made and either regulations are issued or, if the taking is limited to harassment, a notice of an incidental take authorization may be provided to the public for review.

Authorization for incidental takings shall be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s) and will not have an unmitigable adverse impact on the availability of the species or stock(s) for taking for subsistence uses (where relevant). Further, NMFS must prescribe the permissible methods of taking and other "means of effecting the least practicable adverse impact" on the affected species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of the species or stocks for taking for certain subsistence uses (referred to in shorthand as "mitigation"); and requirements pertaining to the mitigation, monitoring and reporting of the takings are set forth. The definitions of all applicable MMPA statutory terms cited above are included in the relevant sections below.

Summary of Request

On October 2, 2020, NMFS received a request from the POA for an IHA to take marine mammals incidental to pile driving associated with the relocation of the SFD within Knik Arm in upper Cook Inlet, Alaska. Revised applications were submitted by the POA on December 15, 2020, January 29, 2021, February 5, 2021, and March 5, 2021 that addressed comments provided by NMFS. The application was deemed adequate and complete on March 17, 2021. Additional revised applications were submitted on March

26, 2021, which addressed typos, and May 14 2021, which adjusted transmission loss rates based on the final Petroleum Cement Terminal (PCT) Hydroacoustic Monitoring Report for activities completed in 2020 (Reyff *et al*., 2021). The POA requested, and NMFS has authorized, take of a small number of six species of marine mammals by Level B harassment and Level A harassment. Neither the POA nor NMFS expects serious injury or mortality to result from this activity, nor did NMFS authorize any. Therefore, an IHA is appropriate.

NMFS previously issued IHAs to the POA for pile driving (73 FR 41318, July 18, 2008; 74 FR 35136, July 20, 2009; 81 FR 15048, March 21, 2016; and 85 FR 19294, April 06, 2020). The POA has complied with the requirements (*e.g.*, mitigation, monitoring, and reporting) of all previous IHAs and information regarding their monitoring results may be found in the **Effects of the Specified Activity on Marine Mammals and their Habitat** and **Estimated Take** sections.

Description of Specified Activity

The POA is modernizing its marine terminals through the Port of Alaska Modernization Program (PAMP). One of the first priorities of the PAMP is to replace the existing Petroleum Oil Lubricants Terminal with a new PCT. For the PCT project to advance, the existing SFD, a small multipurpose floating dock important for staging, mooring, and docking of small vessels, such as first responder (*e.g.*, Anchorage Fire Department, U.S. Coast Guard) rescue craft, small work skiffs, and occasionally tug boats, must be relocated south of the PCT. The existing location of SFD will not allow docking operations at SFD once the PCT is constructed due to the close proximity of one of the PCT mooring dolphins (a structure for berthing and mooring of vessels). Relocation of the SFD will include the removal of the existing access trestle and gangway, and vibratory or impact installation of twelve permanent 36-inch steel pipe piles: ten vertical and two battered (an impact hammer may be required if a pile

encounters refusal and cannot be advanced to the necessary tip elevation with the vibratory hammer; Table 1). Construction of the SFD will also require the installation and vibratory removal of up to six 24- or 36-inch temporary template piles (Table 1). In-water pile installation and removal associated with SFD removal and construction is anticipated to take place on up to 24 nonconsecutive days between the date of issuance and November 2021. A detailed description of the POA's SFD activities is provided in the **Federal Register** notice of the proposed IHA (86 FR 31870, June 15, 2021). Since that time, no changes have been made to the planned relocation and construction activities, other than project timing due to delays in construction scheduling and the timing of the issuance of the IHA (The project was originally scheduled to occur on up to 24 nonconsecutive days between April and November 2021 but is now scheduled to occur between the date of issuance and November 2021). Therefore, a detailed description is not provided here. Please refer to that **Federal Register** notice for the description of the specific activity.

Table 1. Pile Details and Estimated Effort Required for Pile Installation and Removal

Pipe Pile Diameter	Feature	Number of Plumb Piles	Number of Battered Piles	Vibratory Installation Duration Per Pile (minutes)	Vibratory Removal Duration Per Pile (minutes)	Potential Impact Strikes per Pile, if Needed (up to 5 Piles; One Pile per Day)	Production Rate (piles/day)		Days of Installation	Days of Removal
							Installation	Removal		
36-inch	Floating Dock	6	2	45	n/a	1,000	1-3	n/a	4-12	n/a
	Gangway	4	0		n/a	1,000	1-3	n/a		n/a
24- or 36-inch	Temporary Template Piles	6	0	45	75	1,000	1-2	1-3	3-6	2-6
Project Totals		16	2	13.5 hours	7.5 hours		--	--	7-18 days	2-6 days

Mitigation, monitoring, and reporting measures are described in detail later in this document (please see **Mitigation** and **Monitoring and Reporting**).

Comments and Responses

A notice of NMFS' proposal to issue an IHA to the POA was published in the **Federal Register** on June 15, 2021 (86 FR 31870). That notice described, in detail, POA's activity, the marine mammal species that may be affected by the activity, and the anticipated effects on marine mammals. During the 30-day public comment period, NMFS received comments from one private citizen and from the Defenders of Wildlife. A summary of the commenters' recommendations as well as NMFS' responses is below. Please see the Defender of Wildlife's letter for full details regarding their recommendations and rationale. The letter is available online at: *https://www.fisheries.noaa.gov/permit/incidental-take-authorizations-under-marine-mammal-protection-act*.

Comment 1: The Defenders of Wildlife raised concerns about the noise levels in Cook Inlet and the status of the Cook Inlet beluga whales (CIBWs). They commended our proposed measure to not allow battered piles to be driven during August and September but asserted that no pile driving activities associated with the project should be authorized in August or September in order for NMFS to justify our negligible impact and least practicable adverse impact findings.

Response: The MMPA requires that an IHA include measures that will affect the least practicable adverse impact on the affected species and stock and, which may include conditions for the construction activities that avoid and/or minimize adverse effects on CIBWs in and around the project area, where practicable. Mitigation and monitoring requirements have been included in the IHA to ensure the least practicable adverse impact on CIBWs and other marine mammal species in the project area. These requirements include the use of a bubble curtain system for the installation and removal

of all plumb piles, the implementation of a robust marine mammal monitoring program, which will consist of eleven Protected Species Observers (PSOs) working from four unique locations spread over a 9 km-long stretch of surrounding coastline, and shutdown measures when CIBWs are observed approaching or entering the mouth of Knit Arm or the Level B harassment zone. These measures are designed to ensure CIBWs will not abandon critical habitat and that exposure to pile driving noise will not result in adverse impacts on the reproduction or survival of any individuals. These mitigation and monitoring measures are modeled after the measures included in the final IHAs for Phase 1 and Phase 2 PCT construction (85 FR 19294, April 6, 2020), which appeared to be effective at avoiding and minimizing impacts to marine mammals in the project area, as evidenced by observations made during PCT Phase 1 construction monitoring (61 North Environmental, 2021) as described below.

The commenters expressed concern that permitting the project as proposed will create and/or exacerbate a condition where it is not possible for any beluga whale to transit past the project area to or from critical foraging and nursing habitat in Knik Arm. This concern is not supported by observations made of CIBWs during pile driving activities at the POA (*e.g.*, Kendall and Cornick, 2015, 61 North Environmental, 2021). As described in the **Negligible Impact Analyses and Determinations** sections of the **Federal Notices** of the proposed IHA (86 FR 31870, June 15, 2021) and this final IHA, monitoring data from the POA suggest pile driving does not discourage CIBWs from entering and transiting through Knik Arm. For example, CIBWs continued to use Knit Arm during the duration of the PCT Phase 1 construction project in 2020 and frequently transited past the project area to or from critical foraging grounds and possible nursing habitat such as those around Eagle Bay (61 North Environmental, 2021). Sighting rates have also not been different in the presence or absence of pile driving (Kendall and Cornick, 2015). While some individuals have demonstrated responses to pile driving

activities, CIBWs were more likely to display no reaction or to continue to move towards the POA during pile installation and removal during PCT Phase 1 construction monitoring (61 North Environmental, 2021). In situations during which CIBWs have shown a possible reaction to pile driving, observed behavioral responses have been limited to increased travel speeds and tighter group formations (*e.g.*, Kendall and Cornick, 2015, 61 North Environmental, 2021); CIBWs did not abandon critical habitat and actively transited past the project area. This traveling behavior past the POA has also been verified by acoustic monitoring (*e.g.*, Castellote *et al*., 2020). We anticipate that disturbance to CIBWs would manifest in the same manner when they are exposed to noise during the SFD project: whales will not demonstrate a response or they will move quickly and silently through the area in more cohesive groups. We further do not believe exposure to elevated noise levels during transit past the POA will have adverse effects on reproduction or survival as the whales continue to access critical foraging grounds north of the POA, and that tight associations may help to mitigate the potential for any contraction of communication space for a group.

The Defenders of Wildlife were also concerned that low levels of noise may have biological impacts by "masking" important communication signals, influencing communication behaviors and disrupting foraging for Cook Inlet beluga whales and that masking may not be detected by visible observations. While both masking of communication signals and temporary threshold shifts (TTS) could potentially occur, noise impacts will occur over a short time (*i.e.*, up to 21 total hours spread over nine to 24 non-consecutive days), and would be limited to the short duration a marine mammal would likely be present within a Level B harassment zone during pile driving. This short timeframe minimizes the probability of multiple exposures on individuals, and any repeated exposures that do occur are not expected to occur on sequential days, decreasing the likelihood of physiological impacts caused by chronic stress or sustained energetic

impacts that might affect survival or reproductive success. We agree that masking of important communication signals may not be detected by visible observations, and we discuss the implications of masking and TTS in the **Federal Notice** of the proposed IHA (86 FR 31870, June 15, 2021). NMFS has determined that the temporary masking of signals that could result from the short-term, intermittent pile driving activities would not affect the annual rates of recruitment or survival for any marine mammal species present in the project area and, therefore, do not affect our negligible impact determination. Further, the required mitigation and monitoring measures included in this IHA are designed to minimize to the least practicable extent the impacts that noise from the POA's pile driving activities will have on the health and behavior of marine mammals in the project area, including masking of their signals.

The commenters also argued that the size of the (additive) ensonified area is less important than the amount of (additive) noise in the areas that belugas will likely use. While we acknowledge that the POA's activities will add noise into the marine environment that CIBWs use, this small, short-term project is not expected to impact the reproduction or survival of any individual CIBWs or other marine mammal species in the project area.

The commenters recommended that we assess alternatives for pile driving in August or September. Restricting all pile installation and removal in August and September as recommended is not practicable for the POA to implement. It is necessary for construction of the SFD to proceed in August and/or September for installation of at least the plumb (vertical) piles in order to allow for completion of the SFD project during the 2021 construction season. Pile installation for the new SFD must begin before the onset of poor fall weather, when snow, ice, and limited daylight hours can slow the pace of construction or prevent timely completion of required tasks. A delay in timing of construction, such as a prohibition on all pile installation in August and September, could

extend construction into the spring of 2022 when no in-water construction work is currently scheduled. This delay results in the need for remobilization of pile installation construction equipment, and costly consequences for the POA. In addition, it would delay operation of the SFD to 2022. The SFD is a key facility for the Municipality of Anchorage and provides staging, mooring, and docking of small vessels, such as first responder (*e.g.*, Anchorage Fire Department, U.S. Coast Guard) rescue craft; small work skiffs; and occasionally tug boats, in an area close to the daily operations at the Port. The SFD also supports dredging and bathymetric survey vessels and other municipal and port operations. Upper Cook Inlet near Anchorage exhibits the largest tide range in the U.S. and one of the largest tide ranges in the world, with an average daily difference between high and low tide of 8 meters (26.2 feet) and an extreme difference of up to 12.5 meters (41 feet) (NOAA 2015). The ability of first responders to conduct response operations during low tide stages requires access to the SFD, as the waterline is inaccessible for vessels at the nearby Anchorage public boat launch at Ship Creek during low waters. Thus, it is imperative that construction of the SFD proceed as proposed given it is required to provide continuous, timely, and safe access for rescue personnel and vessels in the northern portion of Cook Inlet. Finally, a delay leading to construction in 2022 could result in additional harassment exposure to marine mammals next year. The POA has indicated that it is practicable that they not install the two permanent battered piles, which have Level B harassment distances that are approximately two or more times greater than all other plumb piles, in August and September. This requirement will both minimize the size of the ensonified area during the peak CIWB season in the project area and maximize the probability of CIBW detections by PSOs and necessary shutdowns during pile driving activities.

For these reasons stated above, we disagree that our current analysis undermines both the negligible impact conclusion and the least practicable impact. In consideration of

the likely effects of the activity on marine mammals absent mitigation, potential unintended consequences of the measures as proposed by the commenters, and practicability of the recommended measures for the applicant, NMFS has determined that restricting construction as recommended is not warranted or practicable in this case and that the authorized takes will have a negligible impact on CIBWs and the other affected marine mammal species or stocks.

Comment 2: The Defenders of Wildlife assert that our negligible impact determination is flawed because we incorrectly indicated that area of exposure would be limited to travel corridors and that no critical foraging grounds would be impacted by pile driving.

Response: In accordance with our implementing regulations at 50 CFR 216.104(c), we use the best available scientific evidence to determine whether the taking by the specified activity within the specified geographic region will have a negligible impact on the species or stock and will not have an unmitigable adverse impact on the availability of such species or stock for subsistence uses. Based on the scientific evidence available, NMFS determined that the impacts of the authorized take incidental to pile driving would result in a negligible impact on CIBWs and other marine mammals in the project area. We acknowledged that CIBWs have been occasionally documented to forage around Ship Creek in the **Federal Notice** of the proposed IHA (86 FR 31870, June, 15, 2021) but that they may choose to move past the POA to other, potentially richer, feeding areas further into Knik Arm (*e.g.*, Six Mile Creek, Eagle River, Eklutna River) which contain predictable salmon runs (ADF&G, 2010) during pile driving activities.

During PCT Phase 1 construction monitoring (61 North Environmental, 2021) observations of CIBWs near Ship Creek involved animals transiting past or milling near or in front of the creek. While CIBWs may forage in or near Ship Creek, there are other

known foraging grounds in the project area that CIBWs can transit to during pile driving activities. In addition, prey for CIBWs are mobile and broadly distributed throughout the project area; therefore, CIBWs are expected to be able to resume foraging once they have moved away from any areas with disturbing levels of underwater noise. There is ample foraging habitat adjacent to the project area that will not be ensonified by pile driving. Further, impacts on primary prey species will be short-term and localized, and the project is not anticipated to substantially impede migration of adult or juvenile Pacific salmon or adversely affect the health and survival of the affected species at the population level. Affected fish would represent only a portion of food available to marine mammals in the area. While we agree with the commenters that noise pollution at the POA could impact both beluga and prey behavior near the POA, our initial negligible impact determination does not change due to possible CIBW foraging activities near Ship Creek. We have however, updated our negligible impact analysis to state that the area of exposure will be limited to habitat primarily used as a travel corridor to account for possible foraging activities within the area of exposure.

Comment 3: The Defenders of Wildlife assert that NMFS must employ the precautionary principle and avoid sanctioning further impediments to the recovery of CIBWs even while striving to better understand those impediments.

Response: The MMPA states that, upon request, NMFS shall authorize, for periods of not more than one year, the incidental taking by harassment of small numbers of marine mammals if NMFS finds that such harassment during each period concerned will have a negligible impact on such species or stocks and will not have an unmitigable adverse impact on the availability of such species or stocks for taking for subsistence uses (where relevant). In making our determinations we consider factors such as those recommended by the commenters including the level of existing background noise, the additive noise, and the timing and importance of belugas' use of the impacted areas when

deciding whether or not an activity will have a negligible impact on affected marine mammal species or stocks. NMFS has defined negligible impact as an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival (50 CFR 216.103). We discuss our analysis and findings in the **Negligible Impact Analyses and Determinations** sections of the **Federal Notices** of the proposed IHA (86 FR 31870, June, 15, 2021) and this IHA. The extensive monitoring and mitigation required in the IHA and described in the **Mitigation** and **Monitoring and Reporting** of this notice supports these determinations. Neither the MMPA nor NMFS' implementing regulations include discussion or requirements related to a "precautionary principle," and it would be inappropriate to deny the issuance of an IHA based on the precautionary principle if the MMPA issuance criteria have been satisfied.

Comment 4: The Defenders of Wildlife expressed concern that NMFS set the Level B harassment threshold at 122.2 decibel (dB) (root mean square; rms) despite our understanding that responses including avoidance and altered group behaviors can be triggered at 120 dB. They also expressed concern that the entire width of Knik Arm may be ensonified by levels exceeding the Level B threshold preventing safe passage for belugas.

Response: NMFS typically uses 120 dB (rms) as the exposure for estimating Level B harassment takes for continuous (*e.g.*, vibratory pile driving) sources, but will adjust this threshold when background levels exceed this threshold such as in noisy environments like upper Cook Inlet. We acknowledge however that the use of a single threshold is a simplistic approach. This dB-based threshold is a step-function approach (*i.e.*, animals exposed to received levels above the threshold are considered to be "taken" and those exposed to levels below the threshold are not); but it is intended as a sort of mid-point of likely behavioral responses (which are extremely complex depending on

many factors including species, noise source, individual experience, and behavioral context). What this means is that, conceptually, the function recognizes that some animals exposed to levels below the threshold will in fact react in ways that are appropriately considered take, while others that are exposed to levels above the threshold will not. Use of a specific dB threshold allows for a simplistic quantitative estimate of take, while we can qualitatively address the variation in responses across different received levels in our discussion and analysis. Further, as is the case here, when the measured ambient noise is higher than the typical 120-dB continuous noise Level B harassment threshold (suggesting that marine mammals are regularly exposed to the higher level in the area), it is appropriate to raise the behavioral harassment threshold such that take by behavioral harassment is predicted only when marine mammals are predicted to receive sounds above the regularly occurring ambient noise in the area.

NMFS reviewed data recently collected at the POA to establish an appropriate Level B harassment threshold for the SFD project. During the 2016 Test Pile Program (TPP), the POA conducted "ambient" acoustic monitoring, in accordance with accepted methodology for characterizing ambient noise levels (NMFS, 2012). NMFS considers the median sound levels to be most appropriate when considering background noise levels for purposes of evaluating the potential impacts of the POA's SFD project on marine mammals (NMFS, 2012). By using the median value, which is the 50th percentile of the measurements, for ambient noise level, one will be able to eliminate the few transient loud identifiable events that do not represent the true ambient condition of the area. The median value thus provides a better representation of background noise levels that are applicable to when the SFD project would be occurring. During the 2016 TPP, median ambient noise levels (in the absence of pile driving) were 122.2 dB. More information of this analysis can be found in our notice of the proposed IHA. While background noise levels absent pile driving were collected by Reyff *et al*. (2021), these measurements were

not collected in accordance to NMFS (2012) guidance for measuring ambient noise and thus cannot be used here for determining the Level B harassment threshold at the POA.

The Defenders of Wildlife claim that noise from one component of the PCT project ensonified much, and at times all, of the mouth of Knik Arm to a level greater than the 122.5 dB Level B harassment standard used for that project making it difficult and at times impossible for belugas to transit the area without being harassed. We acknowledged in the **Federal Register** notice of the final IHAs for the PCT project (85 FR 19294, April 06, 2020) that Level B harassment isopleths would extend across the mouth of Knit Arm. However, strict mitigation and monitoring measures were required that minimized any harassment to marine mammals in the project area and will be subsequently required for the SFD project. For example, the POA was required to shut down all pile driving activities should a CIBW approach or enter the mouth of Knit Arm or a Level B harassment zone. In addition, the MMPA gives NMFS the authority to authorize, upon request, the incidental, but not intentional, taking of small numbers of marine mammals if NMFS finds that that the taking will have a negligible impact on the species or stock(s) and will not have an unmitigable adverse impact on the availability of the species or stock(s) for taking for subsistence uses (where relevant). These findings were met in the **Federal Register** notice of the final IHAs for the PCT project and are similarly met for the relocation and construction of the POA's SFD, even though noise from some of the POA's activities may ensonify much or all of the mouth of Knik Arm.

Comment 5: The Defenders of Wildlife concur that the available evidence indicates behavioral reactions to noise do not result in habitat abandonment, but they argue that the absence of evidence of habitat abandonments does not prove that noise impact around the Port are negligible.

Response: NMFS has defined negligible impact as an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to,

adversely affect the species or stock through effects on annual rates of recruitment or survival (50 CFR 216.103). As described in the **Negligible Impact Analysis and Determination** sections of the **Federal Notices** of the proposed IHA (86 FR 31870, June, 15, 2021) and this final IHA, a negligible impact finding is based on the lack of likely adverse effects on annual rates of recruitment or survival (*i.e.*, population-level effects). In our analysis, we discuss many factors, including the absence of habitat abandonments, to support our determination that the noise impacts from the POAs relocation and construction of the SFD are negligible. Our analysis also includes observations of large numbers of CIBWs entering and transiting through Knik Arm during pile driving activities (*e.g.*, Kendall and Cornick, 2015, 61 North Environmental, 2021), many of whom were more likely to display no reaction or to continue to move towards the POA during PCT Phase 1 construction monitoring (61 North Environmental, 2021). Based on this analysis, and the required mitigation and monitoring, we have determined that the total marine mammal take from the POA's relocation and construction of the SFD will not affect annual rates of recruitment or survival, and thus will have a negligible impact on all affected marine mammal species or stocks.

Comment 6: The Defenders of Wildlife commented that dredging at the Port would likely expose any beluga that enters or exits Knik Arm to levels of noise exceeding the current behavioral harassment threshold and cited Castellote *et al.* (2019) in support of this concern.

Response: Dredging is not a component of the Port's specified activities; thus, this comment is not relevant to this IHA and is not discussed further.

Comment 7: The Defenders of Wildlife support Castellote *et al.* (2019) who indicated that revision of the spatial extent of the current critical habitat exclusion zone (around the Port) is warranted as it coincides with the most acoustically disturbed area of Cook Inlet. Within their critical habitat discussion, they also support the recommendation

by Castellote *et al.* (2019) that management implications for anthropogenic noise around the POA should include avoiding concurrent emission of noise at both the POA and Point McKenzie; evaluating the acoustic footprint of different modes and types of seasonal dredge operations; defining shut down protocols, if necessary, based on observed beluga behavioral reactions; and seasonal scheduling of activities to reduce overlap with beluga peak use of the port basin.

Response: NMFS published the final rule designating critical habitat for CIBWs on April 11, 2011 (76 FR 20180). Designation or revision of critical habitat NMFS responsibility under the ESA and therefore is outside the scope of management actions taken under the MMPA and described in this notice and is not discussed further. More information on CIBW critical habitat can be found at *https://www.fisheries.noaa.gov/action/critical-habitat-cook-inlet-beluga-whale*.

Comment 8: The Defenders of Wildlife support the recommendation cited by Castellote *et al*. (2019) that a cumulative impact analysis approach should be implemented as part of the permitting process.

Response: Neither the MMPA nor NMFS' implementing regulations call for consideration of other unrelated activities and their impacts on populations. The preamble for NMFS' implementing regulations (54 FR 40338; September 29, 1989) states in response to comments that the impacts from other past and ongoing anthropogenic activities are to be incorporated into the negligible impact analysis via their impacts on the baseline. Consistent with that direction, NMFS has factored into its negligible impact analysis the impacts of other past and ongoing anthropogenic activities via their impacts on the baseline, *e.g.*, as reflected in the density/distribution and status of the species, population size and growth rate, and other relevant stressors. The 1989 implementing regulations also addressed public comments regarding cumulative effects from future, unrelated activities. There NMFS stated that such effects are not considered in making

findings under section 101(a)(5) concerning negligible impact. In this case, both this IHA, as well as other IHAs currently in effect or proposed within the specified geographic region, are appropriately considered an unrelated activity relative to the others. The IHAs are unrelated in the sense that they are discrete actions under section 101(a)(5)(D), issued to discrete applicants.

Section 101(a)(5)(D) of the MMPA requires NMFS to make a determination that the take incidental to a "specified activity" will have a negligible impact on the affected species or stocks of marine mammals. NMFS' implementing regulations require applicants to include in their request a detailed description of the specified activity or class of activities that can be expected to result in incidental taking of marine mammals. 50 CFR 216.104(a)(1). Thus, the "specified activity" for which incidental take coverage is being sought under section 101(a)(5)(D) is generally defined and described by the applicant. Here, the POA was the applicant for the IHA, and we are responding to the specified activity as described in that application (and making the necessary findings on that basis). Through the response to public comments in the 1989 implementing regulations, we also indicated (1) that NMFS would consider cumulative effects that are reasonably foreseeable when preparing a National Environmental Policy Act (NEPA) analysis, and (2) that reasonably foreseeable cumulative effects would also be considered under section 7 of the ESA for ESA-listed species.

In this case, cumulative impacts have been adequately addressed under NEPA in the final environmental assessment (EA) supporting NMFS' determination. In the final EA, we reviewed potential direct, indirect, and cumulative impacts to protected species and their environment, associated with NMFS' proposed action and alternatives. Separately, cumulative effects were analyzed as required through NMFS' required intra-agency consultation under section 7 of the ESA. The Biological Opinion (BiOp) that

NMFS Alaska Region issued on August 9, 2021 determined that NMFS' action of issuing the IHA is not likely to adversely affect listed marine mammals or their critical habitat.

Comment 9: The Defenders of Wildlife raise a concern that while the Marine Mammal Commission has long advised NMFS to track all anthropogenic activities that may result in the taking of a beluga, and to place annual limits on the total number and types of take authorized based on the most recent population estimate, these suggestions, which are reflected in the Recovery Plan, have not yet been implemented. They recommend that in the absence of any limit on the total number of beluga takes authorized over a given time period, temporal restrictions that avoid additive noise impacts in already-ensonified areas where belugas are known to occur in significant numbers is a clear means of effecting the least practicable impact.

Response: As stated in our response to Comment 3, the MMPA states that, upon request, NMFS shall authorize, for periods of not more than one year, the incidental taking by harassment of small numbers of marine mammals if NMFS finds that such harassment during each period concerned will have a negligible impact on such species or stocks and will not have an unmitigable adverse impact on the availability of such species or stocks for taking for subsistence uses. Section 101(a)(5)(A) of the MMPA addresses the analysis and authorization of take from a "specified activity;" and, therefore, setting limits on the number and types of CIBW takes across all activities in Cook Inlet would not be an appropriate requirement of an MMPA incidental take authorization. It is worth noting that while the Defenders of Wildlife's provide estimates regarding the percentages of CIBWs authorized for take each year in IHAs to support their concern and reasoning for placing annual limits on take, they did not describe how they calculated these annual take estimates. We believe that the estimates they provide may be overestimated. The take estimates we authorize represent the upper limits for individuals, and some instances of take may represent multiple exposures to a single

individual. Further, NMFS here has factored into its negligible impact analyses the impacts of other past and ongoing anthropogenic activities via their impacts on the baseline (*e.g.*, as reflected in the density/distribution and status of the species, population size and growth rate, and relevant stressors (such as incidental mortality in commercial fisheries, Unusual Mortality Events (UMEs), and subsistence hunting)). See the **Negligible Impact Analyses and Determinations** section of this notice of issuance.

Separately, setting blanket take limits may not be meaningful, as the nature and intensity of impacts from a given activity can vary widely. For example, an animal exposed to noise levels just above our harassment threshold in a non-critical area may experience a small behavioral change with no biological consequence while an animal exposed to very loud noise levels (but lower than levels that would result in a permanent threshold shift (PTS)) in an area where active critical foraging occurs could result in behavioral changes that may be more likely to impact fitness. While both of these examples would be characterized as Level B harassment, the resulting impact on the population could be different. Context differences such as these are analyzed in our negligible impact analysis for each application under the MMPA.

As described above, this does not mean the cumulative impacts of other actions are not considered, as we have captured past and current actions in our baseline under the MMPA and all past, present and reasonably foreseeable future actions under NEPA. Finally, the reasonably foreseeable cumulative effects to ESA-listed species, including CIBWs, from other activities are considered in the analyses conducted in the BiOp per the ESA. The BiOp, issued August 9, 2021 found NMFS' issuance of the IHA to POA would not jeopardize the continued existence of CIBWs or destroy or adversely modify their critical habitat. For these reasons, we have not implemented the Defender or Wildlife’s recommendation to cap the number of authorized takes of CIBWs across all activities for which take is requested.

Comment 10: A private citizen submitted a comment via email expressing concern for NMFS' regulatory process, our issuance of IHAs' in general, and our definition of small numbers.

Response: We appreciate the commenter's concern regarding the impacts from a wide variety of activities on species of marine mammals throughout U.S. regions. As discussed in the **Background** section of this final notice and our Response to Comment 3, while the MMPA prohibits the "take" of marine mammals, there are certain exceptions. For example, upon request, NMFS shall authorize the incidental, but not intentional, taking by harassment of small numbers of marine mammals for periods of not more than one year to applicants for a specified activity if NMFS finds that such harassment during each period concerned will have a negligible impact on such species or stocks and will not have an unmitigable adverse impact on the availability of such species or stocks for taking for subsistence uses (where relevant). As described in the **Negligible Impact Analyses and Determinations** section, NMFS' analysis supports the conclusion that the take anticipated to result from POA's activity, which consists of 21 hours or pile driving, will have a negligible impact on the affected species or stocks. As described in the **Small Numbers** section, NMFS considers take of up to one-third the number of a species' or stock's abundance to be small (for additional explanation see the Small Numbers section in the Incidental Take Regulations for Geophysical Activities in the Gulf of Mexico: 86 FR 5322, 5438; January 19, 2021), and authorized take is less than that for all affected species or stocks in this authorization. Accordingly, NMFS has issued the final authorization to POA.

Changes from the Proposed IHA to Final IHA

No substantive changes have been made from the proposed IHA to final IHA; however, some small typos and clarifications were addressed including a clarification regarding shutdown zones. In the **Federal Register** notice for the proposed IHA (86 FR

31870, June 15, 2021) and this final notice we stated that if a marine mammal is entering or is observed within an established Level A harassment zone or shutdown zone, pile installation and removal will be halted or delayed. However, the table describing shutdown zones in the IHA (Table 2) only referenced a single 100-m shutdown zone. We have updated this table and language in this final notice to clarify that the shutdown zone is 100-m unless the respective Level A harassment zone is larger; in these instances, the distance to the Level A harassment shutdown zone is the respective shutdown zone. We have also clarified language to better express that the IHA requirements pertain to construction activities directly associated with pile driving installation and removal rather than associated construction activities that occur away from the project site. Lastly, we noticed some repetitive measures so consolidated these to help clarify the requirements of the IHA.

In addition, per the Defenders of Wildlife's concerns in Comment 2, we have updated the language in the **Negligible Impact Analysis and Determination** section to indicate that the area of exposure from the SFD activities will be limited to habitat primarily used as a travel corridor.

Description of Marine Mammals in the Area of Specified Activities

There are six species of marine mammals that may be found in upper Cook Inlet during the pile driving activities. Sections 3 and 4 of the POA's application summarize available information regarding status and trends, distribution and habitat preferences, and behavior and life history, of the potentially affected species. Additional information regarding population trends and threats may be found in NMFS' Stock Assessment Reports (SARs; *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments*), and more general information about these species (*e.g.*, physical and behavioral descriptions) may be found on NMFS's website (*https://www.fisheries.noaa.gov/find-species)*. Additional information on CIBWs

may be found in NMFS' 2016 Recovery Plan for the CIBW (*Delphinapterus leucas*), available online at *https://www.fisheries.noaa.gov/resource/document/recovery-plan-cook-inlet-beluga-whale-delphinapterus-leucas*.

Table 2 lists all species or stocks with expected potential for occurrence in the project area and summarizes information related to the population or stock, including regulatory status under the MMPA and Endangered Species Act (ESA) and potential biological removal (PBR), where known. For taxonomy, we follow Committee on Taxonomy (2019). PBR is defined by the MMPA as the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population (as described in NMFS's SARs). While no mortality is anticipated or authorized here, PBR and annual serious injury and mortality from anthropogenic sources are included here as gross indicators of the status of the species and other threats.

Marine mammal abundance estimates presented in this document represent the total number of individuals that make up a given stock or the total number estimated within a particular study or survey area. NMFS' stock abundance estimates for most species represent the total estimate of individuals within the geographic area, if known, that comprises that stock. For some species, this geographic area may extend beyond U.S. waters. All managed stocks in this region are assessed in NMFS' U.S. 2019 SARs (*e.g.*, Muto *et al*., 2020) and 2020 draft SARs (Muto *et al*., 2021). All values presented in Table 2 are the most recent available at the time of publication and are available in the 2019 and 2020 SARs (Muto *et al*., 2020; Muto *et al*., 2021) (available online at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/draft-marine-mammal-stock-assessment-reports*).

Table 2. Marine mammal species potentially occurring in upper Cook Inlet, Alaska

Common Name	Scientific name	Stock	ESA/MMPA status; Strategic (Y/N)[1]	Stock abundance (CV, N_{min}, most recent abundance survey)[2]	PBR	Annual M/SI[3]
Order Cetartiodactyla – Cetacea – Superfamily Mysticeti (baleen whales)						
Family Balaenopteridae (rorquals)						
Humpback whale	*Megaptera novaeangliae*	Western North Pacific	E/D; Y	1,107 (0.3, 865, 2006)	3	2.8
		Central North Pacific	-/-; Y	10,103 (0.3, 7,890, 2006)	83	26
Superfamily Odontoceti (toothed whales, dolphins, and porpoises)						
Family Delphinidae						
Beluga whale	*Delphinapterus leucas*	Cook Inlet	E/D; Y	279 (0.06, 267, 2018)	0.53	0
Killer whale	*Orcinus orca*	Alaska Resident	-/-; N	2,347 (N/A, 2,347, 2012)	24	1
		Alaska Transient	-/-; N	587 (N/A, 587, 2012)	5.87	0.8
Family Phocoenidae (porpoises)						
Harbor porpoise	*Phocoena*	Gulf of Alaska	-/-; Y	31,046 (0.21 N/A, 1998)	Undet	72
Order Carnivora – Superfamily Pinnipedia						
Family Otariidae (eared seals and sea lions)						
Steller sea lion	*Eumetopias jubatus*	Western	E/D; Y	52,932 (N/A, 52,932 2019)	318	254
Family Phocidae (earless seals)						
Harbor seal	*Phoca vitulina*	Cook Inlet/ Shelikof	-/-; N	28,411 (N/A, 26,907, 2018)	807	107

1 - Endangered Species Act (ESA) status: Endangered (E), Threatened (T)/MMPA status: Depleted (D). A dash (-) indicates that the species is not listed under the ESA or designated as depleted under the MMPA. Under the MMPA, a strategic stock is one for which the level of direct human-caused mortality exceeds PBR or which is determined to be declining and likely to be listed under the ESA within the foreseeable future. Any species or stock listed under the ESA is automatically designated under the MMPA as depleted and as a strategic stock.

[2] - NMFS marine mammal stock assessment reports online at: *www.nmfs.noaa.gov/pr/sars/*. CV is coefficient of variation; Nmin is the minimum estimate of stock abundance. In some cases, CV is not applicable because it has not been calculated.

[3] - These values, found in NMFS' SARs, represent annual levels of human-caused mortality plus serious injury from all sources combined (*e.g.*, commercial fisheries, ship strike). Annual mortality and serious injury (M/SI) often cannot be determined precisely and is in some cases presented as a minimum value or range. A CV associated with estimated mortality due to commercial fisheries is presented in some cases.

As indicated above, all six species (with six managed stocks) in Table 2 temporally and spatially co-occur with the activity to the degree that take is reasonably likely to occur, and we have authorized it. Marine mammals occurring in Cook Inlet that

are not expected to be observed in the project area and for which take is not authorized include gray whales (*Eschrichtius robustus*), minke whales (*Balaenoptera acutorostrata*), and Dall's porpoise (*Phocoenoides dalli*).

In addition, sea otters (*Enhydra lutris*) may be found in Cook Inlet. However, sea otters are managed by the U.S. Fish and Wildlife Service (USFWS) and are not considered further in this document.

A detailed description of the of the species likely to be affected by the pile driving activities, including brief introductions to the species and relevant stocks as well as available information regarding population trends and threats, and information regarding local occurrence, were provided in the **Federal Register** notice for the proposed IHA (86 FR 31870, June 15, 2021); since that time, we are not aware of any changes in the status of these species and stocks other than a change in the total annual mortality and serious injury for Steller sea lions which reflects corrections of errors found when finalizing Young *et al*. (2020) and the final SARs (Muto *et al*., 2021) (Note we also found typos in the minimum population estimate (N_{min}) estimate for Alaska resident Killer whales and stock abundance for Steller sea lions in the **Federal Register** notice for the proposed IHA (86 FR 31870, June 15, 2021) that have been corrected here). Therefore, detailed descriptions are not provided here. Please refer to that **Federal Register** notice for these descriptions. Please also refer to NMFS' website (*https://www.fisheries.noaa.gov/find-species*) for generalized species accounts.

Potential Effects of Specified Activities on Marine Mammals and their Habitat

The **Federal Register** notice of the proposed IHA (86 FR 31870, June 15, 2021) included a discussion of the effects of anthropogenic noise on marine mammals and the potential effects of underwater noise from the POA's specified activities on marine mammals and their habitat. That information and analysis is incorporated by reference into this final IHA determination and is not repeated here; please refer to the **Federal**

Notice of the proposed IHA (86 FR 31870, June 15, 2021). No new data is available that suggests the potential responses and impacts to marine mammals would differ from those discussed in the notice of the proposed IHA.

Estimated Take

This section provides an estimate of the number of incidental takes authorized through this IHA, which will inform both NMFS' consideration of "small numbers" and the negligible impact determination.

Harassment is the only type of take expected to result from these activities. Except with respect to certain activities not pertinent here, section 3(18) of the MMPA defines "harassment" as any act of pursuit, torment, or annoyance, which (i) has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment); or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (Level B harassment).

Authorized takes will primarily be by Level B harassment, as pile driving has the potential to result in disruption of behavioral patterns for individual marine mammals, either directly or as a result of TTS. There is also some potential for auditory injury (Level A harassment) to result, primarily for mysticetes, high frequency species, and phocids because predicted auditory injury zones are larger than for mid-frequency species and otariids. Auditory injury is unlikely to occur for mid-frequency species and otariids. The required mitigation and monitoring measures are expected to minimize the severity of the taking to the extent practicable.

As described previously, no mortality is anticipated or authorized for this activity. Below we describe how the take is estimated.

Generally speaking, we estimate take by considering: (1) acoustic thresholds above which NMFS believes the best available science indicates marine mammals will be

behaviorally harassed or incur some degree of permanent hearing impairment; (2) the area or volume of water that will be ensonified above these levels in a day; (3) the density or occurrence of marine mammals within these ensonified areas; and, (4) and the number of days of activities. We note that while these basic factors can contribute to a basic calculation to provide an initial prediction of takes, additional information that can qualitatively inform take estimates is also sometimes available (*e.g.,* previous monitoring results or average group size). Below, we describe the factors considered here in more detail and present the authorized take estimate.

Acoustic Thresholds

NMFS recommends the use of acoustic thresholds that identify the received level of underwater sound above which exposed marine mammals would be reasonably expected to be behaviorally harassed (equated to Level B harassment) or to incur PTS of some degree (equated to Level A harassment).

Level B Harassment for non-explosive sources – Though significantly driven by received level, the onset of behavioral disturbance from anthropogenic noise exposure is also informed to varying degrees by other factors related to the source (*e.g.*, frequency, predictability, duty cycle), the environment (*e.g.*, bathymetry), and the receiving animals (hearing, motivation, experience, demography, behavioral context) and can be difficult to predict (Southall *et al.,* 2007, Ellison *et al.,* 2012). Based on what the available science indicates and the practical need to use a threshold based on a factor that is both predictable and measurable for most activities, NMFS uses a generalized acoustic threshold based on received level to estimate the onset of behavioral harassment. NMFS predicts that marine mammals are likely to be behaviorally harassed in a manner we consider Level B harassment when exposed to underwater anthropogenic noise above received levels of 120 dB re 1 micropascal (μPa) (rms) for continuous (*e.g.,* vibratory pile-driving, drilling) and above 160 dB re 1 μPa (rms) for non-explosive impulsive (*e.g.*,

seismic airguns) or intermittent (*e.g.*, scientific sonar) sources. This take estimation includes disruption of behavioral patterns resulting directly in response to noise exposure (*e.g.*, avoidance), as well as that resulting indirectly from associated impacts such as TTS or masking. However, ambient noise levels within Knik Arm are above the 120-dB threshold, and therefore, for purposes of this analysis, NMFS considers received levels above those of the measured ambient noise (122.2 dB) to constitute Level B harassment of marine mammals incidental to continuous noise, including vibratory pile driving.

Results from recent acoustic monitoring conducted at the port are presented in Austin *et al.* (2016) wherein noise levels were measured in absence of pile driving from May 27 through May 30, 2016 at two locations: Ambient-Dock and Ambient-Offshore. NMFS considers the median sound levels to be most appropriate when considering background noise levels for purposes of evaluating the potential impacts of the POA's SFD Project on marine mammals (NMFS, 2012). By using the median value, which is the 50_{th} percentile of the measurements, for ambient noise level, one will be able to eliminate the few transient loud identifiable events that do not represent the true ambient condition of the area. This is relevant because during two of the four days (50 percent) when background measurement data were being collected, the U.S. Army Corps of Engineers was dredging Terminal 3 (located just north of the Ambient-Offshore hydrophone) for 24 hours per day with two 1-hour breaks for crew change. On the last 2 days of data collection, no dredging was occurring. Therefore, the median provides a better representation of background noise levels when the SFD project will be occurring. With regard to spatial considerations of the measurements, the Ambient-Offshore location is most applicable to this discussion (NMFS, 2012). The median ambient noise level collected over four days at the end of May at the Ambient-Offshore hydrophone was 122.2 dB. We note the Ambient-Dock location was quieter, with a median of 117 dB; however, that hydrophone was placed very close to the dock and not where we expect

Level B harassment to occur given mitigation measures (*e.g.*, shut downs). We also recognize that during Phase 1 PCT acoustic monitoring, noise levels in Knik Arm absent pile driving were collected (Reyff *et al.*, 2021); however, the Phase 1 PCT IHA did not require ambient noise measurements to be collected. These measurements were not collected in accordance to NMFS (2012) guidance for measuring ambient noise and thus cannot be used here for that purpose. If additional data collected in the future warrant revisiting this issue, NMFS may adjust the 122.2 dB rms Level B harassment threshold.

Level A harassment for non-explosive sources - NMFS' Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 2.0) (NMFS, 2018) identifies dual criteria to assess auditory injury (Level A harassment) to five different marine mammal groups (based on hearing sensitivity) as a result of exposure to noise from two different types of sources (impulsive or non-impulsive). The POA's activity includes the use of non-impulsive (vibratory pile driving) and impulsive (impact pile driving) sources.

These thresholds are provided in Table 3 below. The references, analysis, and methodology used in the development of the thresholds are described in NMFS 2018 Technical Guidance, which may be accessed at *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-acoustic-technical-guidance*.

Table 3. Thresholds Identifying the Onset of Permanent Threshold Shift

	PTS Onset Acoustic Thresholds* (Received Level)	
Hearing Group	Impulsive	Non-impulsive
Low-Frequency (LF) Cetaceans	*Cell 1* $L_{pk,flat}$: 219 dB $L_{E,LF,24h}$: 183 dB	*Cell 2* $L_{E,LF,24h}$: 199 dB
Mid-Frequency (MF) Cetaceans	*Cell 3* $L_{pk,flat}$: 230 dB $L_{E,MF,24h}$: 185 dB	*Cell 4* $L_{E,MF,24h}$: 198 dB
High-Frequency (HF) Cetaceans	*Cell 5* $L_{pk,flat}$: 202 dB	*Cell 6* $L_{E,HF,24h}$: 173 dB

	$L_{E,HF,24h}$: 155 dB	
Phocid Pinnipeds (PW) (Underwater)	*Cell 7* $L_{pk,flat}$: 218 dB $L_{E,PW,24h}$: 185 dB	*Cell 8* $L_{E,PW,24h}$: 201 dB
Otariid Pinnipeds (OW) (Underwater)	*Cell 9* $L_{pk,flat}$: 232 dB $L_{E,OW,24h}$: 203 dB	*Cell 10* $L_{E,OW,24h}$: 219 dB

* Dual metric acoustic thresholds for impulsive sounds: Use whichever results in the largest isopleth for calculating PTS onset. If a non-impulsive sound has the potential of exceeding the peak sound pressure level thresholds associated with impulsive sounds, these thresholds should also be considered.

Note: Peak sound pressure (L_{pk}) has a reference value of 1 µPa, and cumulative sound exposure level (L_E) has a reference value of 1µPa^{2}s. In this Table, thresholds are abbreviated to reflect American National Standards Institute standards (ANSI 2013). However, peak sound pressure is defined by ANSI as incorporating frequency weighting, which is not the intent for this Technical Guidance. Hence, the subscript "flat" is being included to indicate peak sound pressure should be flat weighted or unweighted within the generalized hearing range. The subscript associated with cumulative sound exposure level thresholds indicates the designated marine mammal auditory weighting function (LF, MF, and HF cetaceans, and PW and OW pinnipeds) and that the recommended accumulation period is 24 hours. The cumulative sound exposure level thresholds could be exceeded in a multitude of ways (*i.e.*, varying exposure levels and durations, duty cycle). When possible, it is valuable for action proponents to indicate the conditions under which these acoustic thresholds will be exceeded.

Ensonified Area

Here, we describe operational and environmental parameters of the activity that will feed into identifying the area ensonified above the acoustic thresholds, which include source levels and transmission loss coefficient.

The estimated sound source levels (SSL) proposed by the POA and used in this assessment for vibratory installation of attenuated piles are based on sound levels of 24-inch and 36-inch piles measured during a sound source verification (SSV) study conducted during Phase 1 of the POA's 2020 PCT project (Reyff *et al*., 2021). For the 24-inch template piles, SSLs measured for 24-inch PCT template piles by Reyff *et al.* (2021) were selected for use as a proxy for 24-inch SFD template piles based on anticipated pile function (Table 4). These piles were driven for 19.2 to 25.6 minutes, using an APE 200-6 vibratory hammer and a confined bubble curtain (Reyff *et al*., 2021). For the 36-inch template piles, SSLs are assumed to be similar to the SSLs measured for 36-inch trestle piles installed during PCT construction (note no 36-inch template piles were measured in

Reyff *et al*., 2021) (Table 4). These piles were installed with a confined bubble curtain using an APE 300-6 vibratory hammer; driving times ranged from 22.1 to 36.4 minutes. It is assumed that SLLs during pile installation and removal for both pile sizes will be similar.

No unattenuated 24-inch or 36-inch piles were installed during either the TPP (Austin *et al*., 2016) or PCT SSV projects (Reyff *et al*., 2021). Instead, SSL measurements collected during marine construction projects conducted by the U.S. Navy for the Naval Base Kitsap at Bangor EHW-2 Project (U.S. Navy, 2015), which were installed at similar depths and in a similar marine environment, were used as proxies for vibratory and impact installation of unattenuated piles for the SFD project (Table 4). It is assumed that SSLs during vibratory pile installation and removal will be similar.

SSLs measurements for attenuated 24-inch and 36-inch piles driven with an impact hammer also were not measured during either the TPP (Austin *et al*., 2016) or PCT SSV projects (Reyff *et al*., 2021). SSL measurements for impact installation made by Ryeff *et al.* (2021) were on piles using a confined bubble curtain system with 48-inch piles; whereas, an unconfined system will be used with smaller piles for the SFD. In a confined bubble curtain system, the bubbles are confined to the area around the pile with a flexible material or rigid pipe; however, in an unconfined bubble curtain system, there is no such system for restraining the bubbles (NAVFAC SW, 2020). Unconfined bubble curtain performance is highly variable and effectiveness depends on the system design and on-site conditions such as water depth, water current velocity, substrate and underlying geology. The unconfined systems typically consist of vertically stacked bubble rings, while the confined systems are a single ring at the bottom placed inside a casing that encompasses the pile. The U.S. Navy (2015) summarized several studies which demonstrated that unconfined bubble curtains performance can be effective in attenuating underwater noise from impact pile installation. They found bubble curtain

performance to be highly variable, but based on information from the Bangor Naval Base Test Pile Program, found an average peak SPL reduction of 8 dB to 10 dB at 10 m would be an achievable level of attenuation for steel pipe piles of 36- and 48-inches in diameter. The efficiency of bubble curtains with 24-inch piles was not examined by the U.S. Navy (2015). Based on these analyses, and the effect that local currents may have on the distribution of bubbles and thus effectiveness of an unconfined bubble curtain, NMFS conservatively applies a 7 dB reduction to the U.S. Navy (2015) unattenuated SSLs (Table 4) for attenuated 24-inch and 36-inch piles during impact pile driving (Table 4). These SSLs are consistent with SSLs previously proposed and authorized by NMFS for POA impact pile driving of 24-inch and 36-inch piles (*e.g.*, PCT final IHA [85 FR 19294; April 6, 2020]). This reduction is more conservative than the confined bubble curtain efficacy reported by Reyff *et al.* (2021), which ranged from 9 to 11 dB for peak, rms, and sound exposure level (SEL) single strike measurements.

The transmission loss (TL) coefficients reported in the PCT SSV are highly variable and are generally lower than values previously reported and used in the region. For example, Reyff *et al*. (2021) reported unweighted transmission loss coefficients ranging from 8.9 to 16.3 dB SEL and 7.0 to 16.7 dB rms for impact driving 48-inch attenuated piles. In the PCT final IHA (85 FR 19294; April 6, 2020), the POA proposed, and NMFS applied, a TL rate of 16.85 dB SEL for assessing potential for Level A harassment from impact pile driving and a TL rate of 18.35 dB rms when assessing potential for Level B harassment from impact pile driving for based on Austin *et al*. (2016) measurements recorded during the TPP on 48-in piles. Higher TL rates in Knik Arm are supported by additional studies, such as by Širović and Kendall (2009), who reported a TL of 16.4 dB during impact hammer driving during passive acoustic monitoring of the POA Marine Terminal Redevelopment Project, and by Blackwell (2005) who reported TLs ranging from 16 - 18 dB SEL and 21.8 dB rms for impact and

vibratory installation of 36-inch piles, respectively, during modifications made to the Port MacKenzie dock. After careful inspection of the data presented in the Reyff *et al.* (2021) study (including relevant spectrograms), NMFS is concerned that flow noise in the far field measurements is negatively biasing the regressions derived to infer TL rates. While Reyff *et al*. (2021) discuss attempts they made to remove flow noise from their calculations, NMFS could not conclude that these attempts adequately removed flow noise from their measurements. Relevant to the SFD, the TL calculations of individual vibratory installation of 24-inch template piles and 36-inch trestle piles reported by Reyff *et al*. (2021) were also highly variable ranging from 12.5 to 16.6 dB rms and 14.4 to 17.2 dB rms, respectively. Given this variability and previous data suggesting higher TL rates, NMFS has determined that applying a practical spreading loss model (15logR) to ensonified area calculations is most likely the representative scenario in Knik Arm (Table 4). The 15 TL coefficient also falls within the range of TL coefficients reported in Reyff *et al*. (2021).

Table 4. Estimated Sound Source Levels and Transmission Loss Coefficients With and Without a Bubble Curtain

Method and Pile Size	Unattenuated					Bubble Curtain				
Vibratory	Sound Level at 10 m (dB rms)			TL Coefficient (dB rms)		Sound Level at 10 m (dB rms)			**TL Coefficient (dB rms)**	
36-inch	166.0[a]			15.0[c]		161.4[b]			15.0[c]	
24-inch	161.0[a]			15.0[c]		158.5[b]			15.0[c]	
Impact	Unattenuated					Bubble Curtain				
	Sound Level at 10 m			TL Coefficient		Sound Level at 10 m			**TL Coefficient**	
	dB rms	dB SEL	dB Peak	dB rms	dB SEL	dB rms	dB SEL	dB peak	**dB rms**	**dB SEL**
36-inch	194.0[a]	184.0[a]	211.0[a]	15.0[c]	15.0[c]	187.0[a]	177.0[a]	204.0[a]	15.0[c]	15.0[c]
24-inch	193.0[a]	181.0[a]	210.0[a]	15.0[c]	15.0[c]	186.0[a]	174.0[a]	203.0[a]	15.0[c]	15.0[c]

[a] U.S. Navy 2015
[b] Reyff *et al*., 2021
[c] Practical spreading loss model

When the NMFS Technical Guidance (2016) was published, in recognition of the fact that ensonified area/volume could be more technically challenging to predict because

of the duration component in the new thresholds, we developed a User Spreadsheet that includes tools to help predict a simple isopleth that can be used in conjunction with marine mammal density or occurrence to help predict takes. We note that because of some of the assumptions included in the methods used for these tools, we anticipate that isopleths produced are typically going to be overestimates of some degree, which may result in some degree of overestimate of Level A harassment take. However, these tools offer the best way to predict appropriate isopleths when more sophisticated 3D modeling methods are not available, and NMFS continues to develop ways to quantitatively refine these tools, and will qualitatively address the output where appropriate. For stationary sources (such as pile driving), NMFS User Spreadsheet predicts the distance at which, if a marine mammal remained at that distance the whole duration of the activity, it would incur PTS. Inputs used in the User Spreadsheet, and the resulting isopleths are reported below in Table 5.

Table 5. NMFS User Spreadsheet Inputs

USER SPREADSHEET INPUT: VIBRATORY PILE DRIVING				
	24-inch (unattenuated)	24-inch (bubble curtain)	36-inch (unattenuated)	36-inch (bubble curtain)
Spreadsheet Tab Used	A.1) Non-Impul, Stat, Cont.	A.1) Non-Impul, Stat, Cont.	A.1) Non-Impul, Stat, Cont.	A.1) Non-Impul, Stat, Cont.
Source Level (SPL RMS)	161	158.5	166	161.4
Transmission Loss Coefficient	15	15	15	15
Weighting Factor Adjustment (kHz)	2.5	2.5	2.5	2.5
Time to install / remove single pile (minutes)	45 / 75	45 / 75	45 / 75	45 / 75
Piles to install / remove per day	1 / 1	1-2 / 1-3	1 / 1	1-3 / 1-3
USER SPREADSHEET INPUT: IMPACT PILE DRIVING				
	24-inch (unattenuated)	24-inch (bubble curtain)	36-inch (unattenuated)	36-inch (bubble curtain)
Spreadsheet Tab Used	E.1) Impact pile driving	E.1) Impact pile driving	E.1) Impact pile driving	E.1) Impact pile driving
Source Level (Single Strike/shot SEL)	181	174	184	177
Transmission Loss Coefficient	15	15	15	15

Weighting Factor Adjustment (kHz)	2	2	2	2
Number of strikes pile	1000	1000	1000	1000
Piles per day	1	1	1	1

To calculate the Level B harassment isopleths, NMFS considered SPLrms source levels and the corresponding TL coefficients (dB rms; Table 4) for impact and vibratory pile driving, respectively. The resulting Level A harassment and Level B harassment isopleths are presented in Table 6.

Table 6. Distances to Level A harassment, by hearing group, and Level B harassment thresholds per pile type and installation method

Pile Size	Attenuation	Hammer Type (Installation/Removal)	Piles per day	Level A harassment (m)					Level A harassment areas (km^2) all hearing groups	Level B harassment (m)
				LF	MF	HF	PW	OW		
24-inch	Bubble Curtain	Vibratory (Installation)	1	4	1	6	3	1	<0.01	2,631
			2	7	1	9	4	1		
		Vibratory (Removal)	1	6	1	8	4	1		
			3	12	1	17	7	1		
		Impact (Installation)	1	251	9	299	135	10	<0.19	542
	Unattenuated	Vibratory (Installation)	1	6	1	9	4	1	<0.01	3,861
		Vibratory (Removal)	1	8	1	12	5	1		
		Impact (Installation)	1	735	27	876	394	29	<1.34	1,585
36-inch	Bubble Curtain	Vibratory (Installation)	1	6	1	9	4	1	<0.01	4,106
			2	10	1	15	6	1		
			3	13	2	19	8	1		
		Vibratory (Removal)	1	9	1	13	6	1		
			3	18	2	26	11	1		
		Impact (Installation)	1	398	15	474	213	16	<0.76	631
	Unattenuated	Vibratory (Installation)	1	13	2	18	8	1	<0.01	8,318
		Vibratory (Removal)	1	18	2	26	11	1		
		Impact (Installation)	1	1,165	42	1,387	624	46	<3.14	1,848

Marine Mammal Occurrence and Take Estimation

In this section we provide the information about the presence, density, or group dynamics of marine mammals that will inform the take calculations.

For all species of cetaceans other than CIBWs, density data is not available for upper Cook Inlet. Therefore, the POA relied on marine mammal monitoring data collected during past POA projects. These data cover the POA's construction season (April through November) across multiple years. Calculations used to estimate exposure from pile installation for all marine mammals is described below.

Humpback whales

Sightings of humpback whales in the project area are rare, and the potential risk of exposure of a humpback whale to sounds exceeding the Level B harassment threshold is low. Few, if any, humpback whales are expected to approach the project area. However, there were two sightings in 2017 of what was likely a single individual at the Ship Creek Boat Launch (ABR Inc., 2017) which is located south of the project area. Based on these data, the POA conservatively estimates that up to two individuals could be behaviorally harassed during the 24 days of pile driving for the SFD. This could include sighting a cow-calf pair on multiple days or multiple sightings of single humpback whales. No Level A harassment take of humpback whales is anticipated or authorized because the likelihood that a humpback whale would be both present in the project area and within the relatively small Level A harassment zones before a shutdown could be called is low.

Killer Whales

Few, if any, killer whales are expected to approach the project area. No killer whales were sighted during previous monitoring programs for the Knik Arm Crossing and POA construction projects, including the 2016 TPP or during Phase 1 of the PCT project in 2020. The infrequent sightings of killer whales that are reported in upper Cook Inlet tend to occur when their primary prey (anadromous fish for resident killer whales and CIBWs for transient killer whales) are also in the area (Shelden *et al*., 2003). Previous sightings of transient killer whales have documented pod sizes in upper Cook

Inlet between one and six individuals (Shelden *et al*., 2003). The potential for exposure of killer whales within the Level B harassment isopleths is anticipated to be extremely low. Level B harassment take is conservatively estimated at no more than one small pod (6 individuals). No Level A harassment take for killer whales is anticipated or authorized due to the small Level A harassment zones (Table 6) and implementation of a 100 m shutdown which is larger than Level A harassment isopleths, and described below in the **Mitigation** section.

Harbor Porpoise

Previous monitoring data at the POA were used to evaluate daily sighting rates for harbor porpoises in the project area. During most years of monitoring, no harbor porpoises were observed; however, during Phase 1 of the PCT project (2020), 18 individuals (15 groups) were observed near the POA, with group sizes ranging from 1 – 2 individuals. The highest daily sighting rate for any recorded year during pile installation and removal associated with the PCT was an average of 0.09 harbor porpoise per day during 2009 construction monitoring, but this value may not account for increased sightings in Upper Cook Inlet or range extensions (Shelden *et al*., 2014). Therefore, the POA estimates that one harbor porpoise could be observed every 2 days of pile driving. Based on this assumption, the POA has requested, and NMFS is authorizing, twelve Level B harassment exposures during the 24 days of pile driving.

Harbor porpoises are relatively small cetaceans that move at high velocities, which can make their detection and identification at great distances difficult. Despite this, PSOs during Phase 1 PCT construction monitoring (61 North Environmental, 2021) were able to detect harbor porpoises as far as 6,486 m from the PCT, indicating that the monitoring methods detailed in the final IHAs for Phase 1 and Phase 2 PCT construction (85 FR 19294; April 6, 2020), (and described below in the **Mitigation** section for the SFD) allowed for harbor porpoises to be detected at great distances. Therefore, no Level

A harassment take for harbor porpoises is anticipated or authorized for the SFD. The POA anticipates that the majority of piles will be driven using vibratory methods. Using the NMFS User Spreadsheet, vibratory driving 24-inch and 36-inch piles results in Level A harassment isopleths that are smaller than the 100-m shutdown zone, described below in the **Mitigation** section (≤ 26 m; Table 6). The Level A harassment isopleths calculated using the NMFS User Spreadsheet for impact driving 24-inch and 36-inch piles are larger (≤ 1,387 m; Table 6); however, the POA is required to shut down pile driving activities should a harbor porpoise be observed entering or within an established Level A harassment zone. In addition, Level A harassment isopleths consider long durations and harbor porpoise are likely moving through the area, if present, not lingering. Further few harbor porpoises are expected to approach the project area and are likely to be sighted prior to entering the Level A harassment zone. During Phase 1 PCT construction monitoring (61 North Environmental, 2021) only five harbor porpoises were observed near the PCT and within the largest Level A harassment zone for SFD (1,387 m; Table 7). Given that the POA anticipates that only a small number of piles (up to five), may be driven with an impact hammer (requiring up to 20 minutes of impact installation each at 1 pile per day), the likelihood that harbor porpoises will be in these larger zones is minimized. Accounting for measures described below in the **Mitigation** section below and the low likelihood that individual harbor porpoises will appear undetected within the Level A harassment zones, we agree with the POA and do not authorize any Level A harassment takes of harbor porpoises during the construction of the SFD.

Steller Sea Lion

Steller sea lions are anticipated to be encountered in low numbers, if at all, within the project area. Three sightings of what was likely a single individual occurred in the project area in 2009, two sightings occurred in 2016, one occurred in 2019, and up to six individuals were observed in 2020 (4 in May and 2 in June). Based on observations in

2016, the POA anticipates an exposure rate of two individuals every 19 days during SFD pile installation and removal. Based on this rate, The POA anticipates that there could be up to four harassment exposures of Steller sea lions during the 24 days of SFD pile installation and removal.

Sea lions are known to travel at high speeds, in rapidly changing directions, and have the potential to be counted multiple times. Because of this the POA anticipates that, despite all precautions, sea lions could enter the Level A harassment zone before a shutdown could be fully implemented. For example, in 2016 during the POA TPP, a Steller sea lion was first sighted next to a work boat and within the Level A harassment zone. Nine PSOs had been monitoring for the presence of marine mammals near the construction activities at this time, but they did not observe the approaching sea lion. Sea lions are known to be curious and willing to approach human activity closely, and they can swim with a low profile. The incident was recorded as a Level A harassment take and raises concern for the POA that a sighting of a Steller sea lion within the Level A harassment zones, while unlikely, could occur. While Level A harassment takes are unlikely given the low likelihood of sea lions in the project area, the small Level A harassment isopleths (< 46 m; Table 6), and the required mitigation measures, including the implementation of shutdown zones and the use of PSOs, we authorize the POA's request that a small number of Steller sea lions could be exposed to Level A harassment levels. Therefore, we authorize that two Steller sea lions could be exposed to Level A harassment levels and 2 Steller sea lions could be exposed to Level B harassment levels.

Harbor Seals

No known harbor seal haulout or pupping sites occur in the vicinity of the POA; therefore, exposure of harbor seals to in-air noise is not considered in this application, and no take for in-air exposure is requested. Harbor seals are not known to reside in the project area, but they are seen regularly near the mouth of Ship Creek when salmon are

running, from July through September. With the exception of newborn pups, all ages and sexes of harbor seals could occur in the project area during construction of the SFD. Any harassment of harbor seals during pile installation will involve a limited number of individuals that may potentially swim through the project area or linger near Ship Creek.

Marine mammal monitoring data were used to examine hourly sighting rates for harbor seals in the project area. Sighting rates of harbor seals were highly variable and appeared to have increased during monitoring between 2005 and 2020 (See Table 4-1 in POA's application). It is unknown whether any potential increase was due to local population increases or habituation to ongoing construction activities. The highest monthly hourly sighting rate (rounded) observed during previous monitoring at the POA was used to quantify take of harbor seals for pile installation associated with the SFD. This occurred in 2020 during Phase 1 PCT construction monitoring, when harbor seals were observed from May through September. A total of 340 harbor seals were observed over 1,237.7 hours of monitoring, at a rate of 0.3 harbor seals per hour. The maximum monthly hourly sighting rate occurred in September and was 0.51 harbor seals per hour. Based on these data, the POA estimates that approximately 1 harbor seal may be observed near the project per hour of hammer use. During the 21 hours of anticipated pile installation and removal, the POA estimates that up 21 harbor seals will be exposed to in-water noise levels exceeding harassment thresholds for pile installation and removal during SFD construction.

All efforts will be taken to shut down prior to a harbor seal entering the appropriate shutdown zone and prior to a harbor seal entering the Level A harassment zones. However, harbor seals often are curious of onshore activities, and previous monitoring suggests that this species may mill at the mouth of Ship Creek. It is important to note that the mouth of Ship Creek is about 700 m from the southern end of the SFD and is outside the Level A harassment zones for harbor seals during both unattenuated

and attenuated vibratory and impact pile installation and removal (Table 6). While exposure is anticipated to be minimized because pile installation and removal will occur intermittently over the short construction period, the POA is requesting Level A harassment take for a small number of harbor seals, given the potential difficulty of detecting harbor seals and their consistent use of the area. Given that 30 harbor seals (8.6 percent) of all harbor seals and unidentified pinnipeds were detected within 624 m, the largest Level A harassment zone for SFD, during PCT Phase 1 construction monitoring (61 North Environmental, 2021), POA requests and NMFS authorizes that two harbor seals (8.6 percent of 21 exposures rounded up) could be exposed to Level A harassment levels and 19 harbor seals could be exposed to Level B harassment levels.

Beluga Whales

For CIBWs, we looked at several sources of information on marine mammal occurrence in upper Cook Inlet to determine how best to estimate the potential for exposure to pile driving noise from the SFD Project. In their application, the POA estimated Level B harassment take following methods outlined in the PCT final IHA (85 FR 19294; April 6, 2020), which relies on monitoring data of CIBWs published in Kendall and Cornick (2015). For the SFD application, POA also considered monitoring data of CIBWs collected during Phase 1 of the PCT project (61 North Environmental, 2021). These data sets (Kendall and Cornick, 2015, and 61 North Environmental, 2021) cover all months the POA could conduct pile driving for the SFD and they are based on all animals observed during scientific monitoring within the proximity of the SFD regardless of distance. Hourly sighting rates for CIBWs for each calendar month were calculated using documented hours of observation and CIBW sightings from April through November for 2005, 2006, 2008 and 2009 (Kendall and Cornick, 2015) and 2020 (61 North Environmental, 2021) (Table 7). The highest calculated monthly hourly sighting rate of 0.94 whales per hour was used to calculate potential CIBW exposures (21

hours of pile installation and removal multiplied by 0.94 whales/hour). Using this method, the POA estimated that 20 CIBWs (rounded from 19.75) could be exposed to the Level B harassment level during pile installation and removal associated with the construction of the SFD. These calculations assume no mitigation and that all animals observed will enter a given Level B harassment zone during pile driving.

Table 7. Summary of CIBWs Sighting Data from April-November 2005-2009 and April-November 2020

Month	Total Hours	Total Groups	Total Whales	Whales/Hour
April	52.50	13	35	0.67
May	457.40	53	208	0.45
June	597.77	37	122	0.20
July	552.67	14	27	0.05
August	577.30	120	543	0.94
September	533.03	124	445	0.83
October	450.70	9	22	0.05
November	346.63	52	272	0.78
Data compiled from Kendall and Cornick (2015) and (61 North Environmental, 2021)				

To more accurately estimate potential exposures than simply using the monthly sighting rate data, which does not account for any mitigation, POA followed methods described by NMFS for the PCT final IHA (85 FR 19294; April 6, 2020), which looked at previous monitoring results at the POA in relation to authorized take numbers. Between 2008 and 2012, NMFS authorized 34 CIBW takes per year to POA, with mitigation measures similar to the measures required here. The percent of the authorized takes documented during this time period ranged from 12 to 59 percent with an average of 36 percent (Table 8). In 2020, NMFS authorized 55 CIBW takes in Phase 1 of the PCT project, with mitigation and monitoring measures that are consistent with those required for the SFD and described below in the **Mitigation** section. The percent of the authorized takes that were documented was 47 percent (26 out of 55 exposures; 61 North Environmental, 2021; Table 8). Given that there was extensive monitoring occurring across all IHAs (with effort intensified in 2020), we believe there is little potential that animals were taken but not observed.

Table 8. Authorized and Reported CIBW Takes during POA activities from 2009-2012 and 2020

ITA effective dates	Reported takes	Authorized takes	Percent of authorized takes
15 July 2008-14 July 2009	12	34	35
15 July 2009-14 July 2010	20	34	59
15 July 2010-14 July 2011	13	34	38
15 July 2011-14 July 2012	4	34	12
1 April 2020-31 March 2021	26	55	47

As described in the POA's application and in more detail in the **Mitigation** section, mitigation measures have been designed to reduce Level B harassment take as well avoid Level A harassment take. We recognize that in certain situations, pile driving may not be able to be shut down prior to whales entering the Level B harassment zone due to safety concerns. During previous monitoring, sometimes CIBWs were initially sighted outside of the harassment zone and shutdown was called, but the CIBWs swam into the harassment zone before activities could be halted, and exposure within the harassment zone occurred. For example, on September 14, 2009, a construction observer sighted a CIBW just outside the harassment zone, moving quickly towards the 1,300 m Level B harassment zone during vibratory pile driving. The animal entered the harassment zone before construction activity could be shut down (ICRC, 2010). On other occasions, CIBWs were initially observed when they surfaced within the harassment zone. For example, on November 4, 2009, 15 CIBWs were initially sighted approximately 950 m north of the project site near the shore, and then they surfaced in the Level B harassment zone during vibratory pile driving (ICRC, 2010). Construction activities were immediately shut down, but the 15 CIBWs were nevertheless exposed within the Level B harassment zone. During Phase 1 of the PCT project all 26 of the recorded takes were instances where the whales were first sighted within the Level B harassment zone, prompting shutdown procedures. Most of these exposures (21 of 26) occurred when the CIBWs first appeared near the northern station, just south of Cairn Point (61 North Environmental, 2021). For example, on November 21, 2020 one CIBW

was sighted in front of the north PSO station, located just south of Cairn Point, traveling south during vibratory removal of an attenuated 36-inch pile and a shutdown was called immediately (61 North Environmental, 2021). In 2020, the northern station did not have visibility of the near shoreline north of Cairn Point. As a result, CIBWs traveling south during ebb tides around Cairn Point were often inside of the Level B harassment zone upon first sighting (61 North Environmental, 2021). As described below in the **Monitoring and Reporting** section, mitigation and monitoring approaches for the SFD project are modeled after the stipulations outlined in the final IHAs for Phase 1 and Phase 2 PCT construction (85 FR 19294; April 6, 2020), but one of the PSO stations will be moved to enhance visibility to the north, especially near Cairn point. Therefore, we believe the ability to detect whales and shut down prior to them entering the Level B harassment zones will be better or consistent with previous years.

To account for these mitigation measures, the POA then applied the highest percentage of previous takes (59 percent) to ensure potential impacts to CIBWs are adequately evaluated. After applying this adjustment to account for potential exposures of CIBWs that will be avoided by shutting down, the POA estimated that 12 CIBWs (20 whales * 0.59 = 11.80 whales; 12 rounded up) may be exposed to Level B harassment during pile installation and removal. The POA and NMFS are concerned, however, that this approach does not accurately reflect the reality that CIBWs can travel in large groups. Large groups of CIBWs have been seen swimming through the POA vicinity during POA monitoring efforts. For example, during Phase 1 of the PCT, the mean group size was 4.34 whales; however, 52 percent of observations were of groups greater than the mean group size, with 5 percent of those 119 groups being larger than 12 individuals, the number of exposures proposed by POA (61 North Environmental, 2021).

To ensure that a large group of CIBWs will not result in the POA using the majority or all of their take in one or two sightings, POA buffered the exposure estimate

detailed in the preceding paragraph by adding the estimated size of a notional large group of CIBWs. The 95th percentile is commonly used in statistics to evaluate risk. Therefore, to determine the most appropriate size of a large group, the POA calculated the 95 percentile group size of CIBWs observed during Kendall and Cornick (2015) and 2020 Phase 1 PCT construction monitoring (61 North Environmental, 2021); the same data used above to derive hourly sighting rates (Table 7 and Figure 3). In this case, the 95th percentile provides a conservative value that reduces the risk to the POA of taking a large group of CIBWs and exceeding authorized take levels. The 95th percentile of group size for the Kendall and Cornick (2015) and the PCT Phase 1 monitoring data (61 North Environmental, 2021) is 12.0. This means that, of the 422 documented CIBW groups in these data sets, 95 percent consisted of fewer than 12.0 whales; 5 percent of the groups consisted of more than 12.0. Considering large group size, the POA requests and we authorize 24 takes (accounting for the 12 takes calculated following the methods outlined for the PCT project that accounts for mitigation plus a group size of 12) of CIBWs incidental to pile driving for the SFD. Incorporation of large groups into the CIBW exposure estimate is intended to reduce risk to the POA of the unintentional take of a larger number of belugas than would be authorized by using the required methods alone and thus improve our estimate of exposure. No Level A harassment is expected or authorized given the small Level A harassment zones for CIBWs (Table 6) and the additional mitigation measures described in the **Mitigation** section below specific to CIBWs, including the measure that pile driving activities must shut down when any CIBW enters the relevant Level B harassment zone.

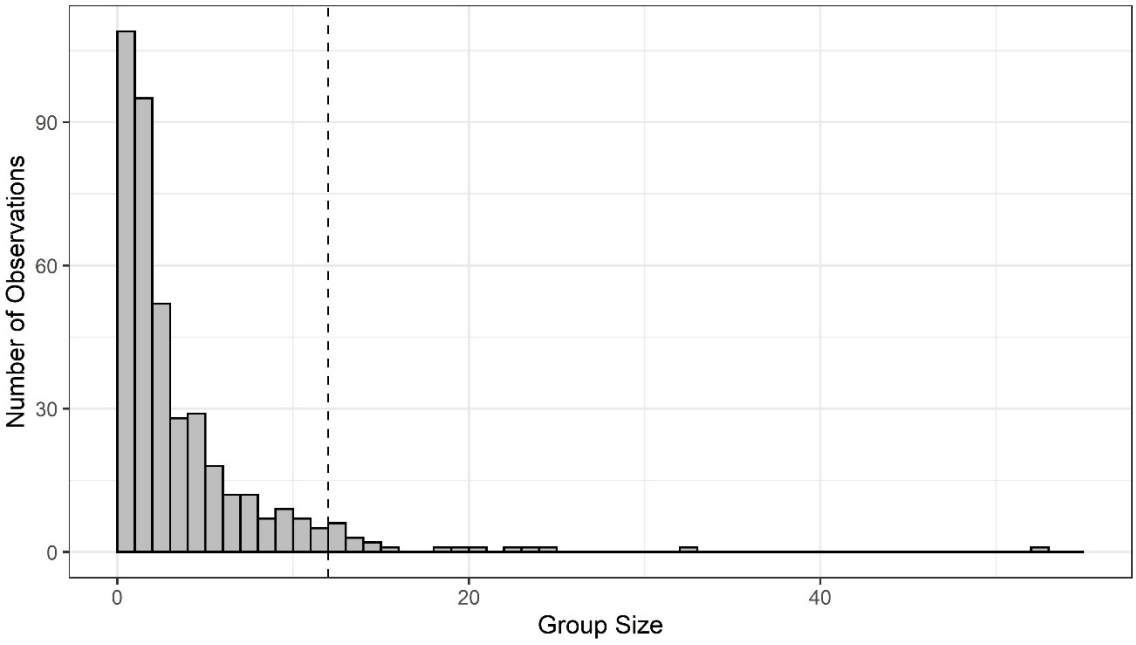

Figure 3. CIBW sighting data from Kendall and Cornick (2015) and Phase 1 of the PCT (61 North Environmental, 2021). The dashed vertical line represents the 95th percentile of group size (*i.e.*, 12 CIBWs)

In summary, the total amount of Level A harassment and Level B harassment authorized for each marine mammal stock is presented in Table 9.

Table 9. Authorized Amount of Take, by stock and harassment type

		Authorized Take		
Species	Stock	Level A	Level B	Percent of Stock
Humpback whale	Western N. Pacific	0	2	0.19
Beluga whale	Cook Inlet	0	24	8.60
Killer whale	Transient/Alaska Resident	0	6	1.02/0.26
Harbor porpoise	Gulf of Alaska	0	12	0.04
Steller sea lion	Western	2	2	<0.01
Harbor seal	Cook Inlet/Shelikof	2	19	0.07

Mitigation

In order to issue an IHA under section 101(a)(5)(D) of the MMPA, NMFS must set forth the permissible methods of taking pursuant to the activity, and other means of effecting the least practicable impact on the species or stock and its habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of the species or stock for taking for certain subsistence uses (latter not

applicable for this action). NMFS regulations require applicants for incidental take authorizations to include information about the availability and feasibility (economic and technological) of equipment, methods, and manner of conducting the activity or other means of effecting the least practicable adverse impact upon the affected species or stocks and their habitat (50 CFR 216.104(a)(11)).

In evaluating how mitigation may or may not be appropriate to ensure the least practicable adverse impact on species or stocks and their habitat, as well as subsistence uses where applicable, we carefully consider two primary factors:

(1) The manner in which, and the degree to which, the successful implementation of the measure(s) is expected to reduce impacts to marine mammals, marine mammal species or stocks, and their habitat. This considers the nature of the potential adverse impact being mitigated (likelihood, scope, range). It further considers the likelihood that the measure will be effective if implemented (probability of accomplishing the mitigating result if implemented as planned), the likelihood of effective implementation (probability implemented as planned); and

(2) The practicability of the measures for applicant implementation, which may consider such things as cost, impact on operations, and, in the case of a military readiness activity, personnel safety, practicality of implementation, and impact on the effectiveness of the military readiness activity.

The POA presented mitigation measures in Section 11 of their application that were modeled after the stipulations outlined in the final IHAs for Phase 1 and Phase 2 PCT construction (85 FR 19294; April 6, 2020), which were successful in minimizing the total number and duration of Level B harassment exposures for endangered CIBWs during Phase 1 PCT Construction (61 North Environmental, 2021). These measures both reduce noise into the aquatic environment and reduce the potential for CIBWs to be adversely impacted from any unavoidable noise exposure.

A key mitigation measure NMFS considered for this project is reducing noise levels propagating into the environment. The POA will deploy an unconfined bubble curtain system during installation and removal of plumb (vertical) 24- and 36-inch piles with a vibratory or impact hammer. An unconfined bubble curtain is composed of an air compressor(s), supply lines to deliver the air, distribution manifolds or headers, perforated aeration pipe, and a frame. The frame facilitates transport and placement of the system, keeps the aeration pipes stable, and provides ballast to counteract the buoyancy of the aeration pipes in operation. The air is released through a series of vertically distributed bubble rings that create a cloud of bubbles that act to impede and scatter sound, lowering the sound velocity. A compressor provides a continuous supply of compressed air, which is distributed among the layered bubble rings. Air is released from small holes in the bubble rings to create a curtain of air bubbles surrounding the pile. The curtain of air bubbles floating to the surface inhibits the transmission of pile installation sounds into the surrounding water column. The final design of the bubble curtain will be determined by the Construction Contractor based on factors such as water depth, current velocities, and pile sizes. However, the IHA requires the bubble curtain be operated in a manner consistent with the following performance standards:

- The aeration pipe system will consist of multiple layers of perforated pipe rings, stacked vertically in accordance with the following depths: two layers for water depths < 5 m; four layers for water depths 5 m to < 10 m; seven layers for water depths 10 m to < 15 m; ten layers for water depths 15 m to < 20 m; and thirteen layers for water depths 20 m to < 25 m;
- The pipes in all layers will be arranged in a geometric pattern that will allow for the pile being driven to be completely enclosed by bubbles for the full depth of the water column and with a radial dimension such that the rings are no more than 0.5 m from the outside surface of the pile;

- The lowest layer of perforated aeration pipe will be designed to ensure contact with the substrate without burial and will accommodate sloped conditions;
- Air holes will be 1.6 millimeters (1/16 inch) in diameter and will be spaced approximately 20 millimeters (3/4 inch) apart. Air holes with this size and spacing will be placed in four adjacent rows along the pipe to provide uniform bubble flux;
- The system will provide a bubble flux of 3 cubic meters (m^3) per minute per linear meter of pipe in each layer (32.91 cubic feet (ft^3) per minute per linear foot of pipe in each layer). The total volume (Vt) of air per layer is the product of the bubble flux and the circumference of the ring using the formula: Vt= 3.0 m^3/min/m * Circumference of the aeration ring in meters or Vt= 32.91 ft^3/min/ft * Circumference of the aeration ring in feet; and
- Meters must be provided as follows:
    - Pressure meters must be installed at all inlets to aeration pipelines and at points of lowest pressure in each branch of the aeration pipeline;
    - Flow meters must be installed in the main line at each compressor and at each branch of the aeration pipelines at each inlet. In applications where the feed line from the compressor is continuous from the compressor to the aeration pipe inlet, the flow meter at the compressor can be eliminated; and
    - Flow meters must be installed according to the manufacturer's recommendation based on either laminar flow or non-laminar flow.

The bubble curtain will be used during installation and removal of all plumb piles when water depth is great enough (approximately 3 m or 9.8 ft) to deploy the bubble

curtain. A bubble curtain will not be used with the two battered piles due to the angle of installation. It is important to note that a small number of piles could be installed or removed when the pile location is de-watered (no water present) or when the water is too shallow (≤ 3 m or 9.8 ft) to deploy the bubble curtain. The tides at the POA have a mean range of about 8.0 m (26 ft) (NOAA, 2015), and low water levels will prevent proper deployment and function of the bubble curtain system. Piles that are driven at a location that is de-watered will not use a bubble curtain, and marine mammal harassment zones will not be monitored. When piles are installed or removed in water without a bubble curtain because the pile orientation is battered, or if water is too shallow (≤ 3 m or 9.8 ft) to deploy the bubble curtain, the unattenuated Level A and Level B harassment zones for that hammer type and pile size will be implemented.

In addition to noise attenuation devices, POA and NMFS considered practicable work restrictions. Given the extensive Level B harassment zone generated from the installation of the two unattenuated battered piles, vibratory driving these large piles during peak CIBW season poses an amount of risk and uncertainty to the degree that it should be minimized. This August and September peak is confirmed through acoustic monitoring (Castellote *et al*., 2020) and Phase 1 PCT construction monitoring (61 North Environmental, 2021). Castellote *et al*. (2020) for example indicate CIBWs appeared concentrated in the upper inlet year-round, but particularly feeding in river mouths from April-December, shifting their geographical foraging preferences from the Susitna River region towards Knik Arm in mid-August, and dispersing towards the mid inlet throughout the winter. Further, hourly sighting rates calculated from monitoring data from Kendall and Cornick (2015) and Phase 1 of the PCT (61 North Environmental, 2021) were highest in August and September (0.94 and 0.83, respectively; Table 8). Therefore, vibratory driving unattenuated battered piles (which have, by far, the largest Level B harassment zones) will not occur during August or September. Further, to

minimize the potential for overlapping sound fields from multiple stressors, the POA will not simultaneously operate two vibratory hammers for either pile installation or removal. This measure is designed to reduce simultaneous in-water noise exposure. Because impact hammers will not likely be dropping at the same time, and to expedite construction of the project to minimize pile driving during peak CIBW abundance periods, NMFS is not proposing to restrict the operation of two impact hammers at the same time. Given the small size of the project and the plan to primarily drive hammers with a vibratory hammer, the POA has indicated that it is highly unlikely that an impact hammer and vibratory hammer or two impact hammers will operate simultaneously during the SFD project.

Additional mitigation measures include the following, modeled after the stipulations outlined in the final IHAs for Phase 1 and Phase 2 PCT construction (85 FR 19294; April 6, 2020):

For in-water construction involving heavy machinery activities other than pile driving (*e.g.*, use of barge-mounted excavators), the POA will cease operations and reduce vessel speed to the minimum level required to maintain steerage and safe working conditions if a marine mammal approaches within 10 m of the equipment or vessel.

POA must use soft start techniques when impact pile driving. Soft start requires contractors to provide an initial set of three strikes at reduced energy, followed by a thirty-second waiting period, then two subsequent reduced energy strike sets. A soft start must be implemented at the start of each day's impact pile driving and at any time following cessation of impact pile driving for a period of thirty minutes or longer. Soft starts will not be used for vibratory pile installation and removal. PSOs shall begin observing for marine mammals 30 minutes before “soft start” or in-water pile installation or removal begins.

The POA will conduct briefings for construction supervisors and crews, the monitoring team, and POA staff prior to the start of all pile installation and removal, and when new personnel join the work in order to explain responsibilities, communication procedures, the marine mammal monitoring protocol, and operational procedures.

The POA will employ PSOs per the Marine Mammal Monitoring Plan (see Appendix A in the POA's application).

Marine mammal monitoring will take place from 30 minutes prior to initiation of pile installation and removal through 30 minutes post-completion of pile installation and removal. The Level B harassment zone must be fully visible for 30 minutes before the zone can be considered clear. Pile driving will commence when observers have declared the shutdown zone clear of marine mammals or the mitigation measures developed specifically for CIBWs (below) are satisfied. In the event of a delay or shutdown of activity, marine mammal behavior will be monitored and documented until the marine mammals leave the shutdown zone of their own volition, at which point pile installation or removal will begin. Further, NMFS requires that if pile driving has ceased for more than 30 minutes within a day and monitoring is not occurring during this break, another 30-minute pre-pile driving observation period is required before pile driving may commence.

If a marine mammal is entering or is observed within an established Level A harassment zone or shutdown zone, pile installation and removal will be halted or delayed. Pile driving will not commence or resume until either the animal has voluntarily left and been visually confirmed 100 m beyond the shutdown zone and on a path away from such zone, or 15 minutes (non-CIBWs) or 30 minutes (CIBWs) have passed without subsequent detections.

If a species for which authorization has not been granted, or a species for which authorization has been granted but the authorized takes are met, is observed approaching

or within the Level B harassment zone, pile installation and removal will shut down immediately. Pile driving will not resume until the animal has been confirmed to have left the area or the 30 minute observation period has elapsed.

In addition to these measures which greatly reduce the potential for harassment of all marine mammals and establish shutdown zones that realistically reflect non-CIBW whale detectability, the following additional mitigation measures will ensure valuable protection and conservation of CIBWs:

Prior to the onset of pile driving, should a CIBW be observed approaching the mouth of Knik Arm, pile driving will be delayed. An in-bound pre-clearance line extends from Point Woronzof to approximately 2.5 km west of Point McKenzie. Pile driving may commence once the whale(s) moves at least 100 m past the Level B harassment zone or pre-clearance zone (whichever is larger) and on a path away from the zone. A similar pre-pile driving clearance zone will be established to the north of the POA (from Cairn Point to the opposite bank), allowing whales to leave Knik Arm undisturbed. Similar to the in-bound whale clearance zone, pile driving may not commence until a whale(s) moves at least 100 m past the Level B harassment zone or pre-clearance zone (whichever is larger) and on a path away from the zone. If non-CIBW whale species are observed within or likely to enter the Level B harassment zone prior to pile driving, the POA may commence pile driving but only if those animals are outside the relevant shutdown zone and Level B harassment takes have not been exceeded.

If pile installation or removal has commenced, and a CIBW(s) is observed within or likely to enter the Level B harassment zone, pile installation or removal will shut down and not re-commence until the whale has traveled at least 100 m beyond the Level B harassment zone and is on a path away from such zone or until no CIBW has been observed in the Level B harassment zone for 30 minutes

There may be situations where it is not possible to monitor the entire Level B harassment zone (*e.g.*, during vibratory hammering of two unattenuated battered piles). In these cases, the pre-clearance zone remains applicable.

If during installation and removal of piles, PSOs can no longer effectively monitor the entirety of the CIBW Level B harassment zone due to environmental conditions (*e.g.*, fog, rain, wind), pile driving may continue only until the current segment of pile is driven; no additional sections of pile or additional piles may be driven until conditions improve such that the Level B harassment zone can be effectively monitored. If the Level B harassment zone cannot be monitored for more than 15 minutes, the entire Level B harassment zone will be cleared again for 30 minutes prior to pile driving.

Based on our evaluation of the applicant's proposed measures, NMFS has determined that the required mitigation measures provide the means effecting the least practicable impact on the affected species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance.

Monitoring and Reporting

In order to issue an IHA for an activity, section 101(a)(5)(D) of the MMPA states that NMFS must set forth requirements pertaining to the monitoring and reporting of such taking. The MMPA implementing regulations at 50 CFR 216.104 (a)(13) indicate that requests for authorizations must include the suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species and of the level of taking or impacts on populations of marine mammals that are expected to be present in the action area. Effective reporting is critical both to compliance as well as ensuring that the most value is obtained from the required monitoring.

Monitoring and reporting requirements prescribed by NMFS should contribute to improved understanding of one or more of the following:

- Occurrence of marine mammal species or stocks in the area in which take is anticipated (*e.g.*, presence, abundance, distribution, density);
- Nature, scope, or context of likely marine mammal exposure to potential stressors/impacts (individual or cumulative, acute or chronic), through better understanding of: (1) action or environment (*e.g.*, source characterization, propagation, ambient noise); (2) affected species (*e.g.*, life history, dive patterns); (3) co-occurrence of marine mammal species with the action; or (4) biological or behavioral context of exposure (*e.g.*, age, calving or feeding areas);
- Individual marine mammal responses (behavioral or physiological) to acoustic stressors (acute, chronic, or cumulative), other stressors, or cumulative impacts from multiple stressors;
- How anticipated responses to stressors impact either: (1) long-term fitness and survival of individual marine mammals; or (2) populations, species, or stocks;
- Effects on marine mammal habitat (*e.g.*, marine mammal prey species, acoustic habitat, or other important physical components of marine mammal habitat); and
- Mitigation and monitoring effectiveness.

The POA will implement a marine mammal monitoring and mitigation strategy intended to avoid and minimize impacts to marine mammals (see Appendix A in the POA's application). The marine mammal monitoring and mitigation program that is planned for SFD construction will be modeled after the stipulations outlined in the final IHAs for Phase 1 and Phase 2 PCT construction (85 FR 19294; April 6, 2020). The POA will collect electronic data on marine mammal sightings and any behavioral responses to in-water pile installation or removal for species observed during pile installation and removal associated with the SFD Project. Four PSO teams will work concurrently to provide full coverage for marine mammal monitoring in rotating shifts during in-water pile installation and removal. All PSOs will be trained in marine mammal identification

and behaviors. NMFS will review submitted PSO resumes and indicate approval as warranted.

All PSOs will also undergo project-specific training, which will include training in monitoring, data collection, theodolite operation, and mitigation procedures specific to the SFD Project. This training will also include site-specific health and safety procedures, communication protocols, and supplemental training in marine mammal identification and data collection specific to the SFD Project. Training will include hands-on use of required field equipment to ensure that all equipment is working and PSOs know how to use the equipment.

Eleven PSOs will be distributed at four stations: Anchorage Downtown Viewpoint near Point Woronzof, the Anchorage Public Boat Dock at Ship Creek, the SFD Project site, and the north end of POA property. These locations were chosen to maximize CIBW detection outside of Knik Arm and the mouth of Knik Arm. Specifically, PSOs at Port Woronzof will have unencumbered views of the entrance to Knik Arm and can provide information on CIBW group dynamics (*e.g.*, group size, demographics, etc.) and behavior of animals approaching Knik Arm in the absence of and during pile driving. During the time since the POA submitted their final application, observers for the 2020 PCT Phase 1 project have recommended, and NMFS has included in the IHA, that the Ship Creek station be moved about 40 m to the end of the promontory to enhance visibility to the north, especially near Cairn point. The POA also considered moving a station from the POA property to Port MacKenzie for an improved view of CIBWs moving from north to south within Knik Arm. However, Port MacKenzie is not an available option due to logistical reasons; therefore, the northern station will remain located on POA property.

Each of the PSO stations will be outfitted with a cargo container with an observation platform constructed on top. This additional elevation provides better

viewing conditions for seeing distant marine mammals than from ground level and provides the PSOs with protection from weather. At least two PSOs will be on watch at any given time at each station; one PSO will be observing, one PSO will be recording data (and observing when there are no data to record). The station at the SFD site will have at least two PSOs. The northern and southern observations stations will have PSOs who will work in three- to four-person teams. Teams of three will include one PSO who will be observing, one PSO who will be recording data (and observing when there are no data to record), and one PSO who will be resting. When available, a fourth PSO will assist with scanning, increasing scan intensity and the likelihood of detecting marine mammals. PSOs will work on a 30 to 60 minute rotation cycle and may observe for no more than 4 hours at time and no more than 12 hours per day. In addition, if POA is conducting non-PCT-related in-water work that includes PSOs, the PCT PSOs must be in real-time contact with those PSOs, and both sets of PSOs must share all information regarding marine mammal sightings with each other.

Trained PSOs will have no other construction-related tasks or responsibilities while conducting monitoring for marine mammals. Observations will be carried out using combinations of equipment that include 7 by 50 binoculars, 20x/40x tripod mounted binoculars, 25 by 150 “big eye” tripod mounted binoculars (North End, Ship Creek, and Woronzof), and theodolites. PSOs will be responsible for monitoring the shutdown zones, the Level A harassment zones, the Level B harassment zones, and the pre-clearance zones, as well as effectively documenting Level A and Level B harassment take. They will also (1) report on the frequency at which marine mammals are present in the project area, (2) report on behavior and group composition near the POA, (3) record all construction activities, and (4) report on observed reactions (changes in behavior or movement) of marine mammals during each sighting. Observers will monitor for marine mammals during all in-water pile installation and removal associated with the SFD

Project. Once pile installation and removal are completed for the day, marine mammal observations will continue for 30 minutes. Observers will work in collaboration with the POA to immediately communicate the presence of marine mammals prior to or during pile installation or removal.

A draft report, including all electronic data collected and summarized from all monitoring locations, must be submitted to NMFS' MMPA program within 90 days of the completion of monitoring efforts. The report must include: dates and times (begin and end) of all marine mammal monitoring; a description of daily construction activities, weather parameters and water conditions during each monitoring period; number of marine mammals observed, by species, distances and bearings of each marine mammal observed to the pile being driven or removed, age and sex class, if possible; number of individuals of each species (differentiated by month as appropriate) detected within the Level A harassment zones, the Level B harassment zones, and the shutdown zones, and estimates of number of marine mammals taken, by species (a correction factor may be applied); description of mitigation implemented, and description of attempts to distinguish between the number of individual animals taken and the number of incidences of take. A final marine mammal monitoring report will be prepared and submitted to NMFS within 30 days following receipt of comments on the draft report from NMFS.

Negligible Impact Analysis and Determination

NMFS has defined negligible impact as an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival (50 CFR 216.103). A negligible impact finding is based on the lack of likely adverse effects on annual rates of recruitment or survival (*i.e.*, population-level effects). An estimate of the number of takes alone is not enough information on which to base an impact determination. In addition to considering estimates of the number of marine mammals

that might be "taken" through harassment, NMFS considers other factors, such as the likely nature of any responses (*e.g.*, intensity, duration), the context of any responses (*e.g.*, critical reproductive time or location, migration), as well as effects on habitat, and the likely effectiveness of the mitigation. We also assess the number, intensity, and context of estimated takes by evaluating this information relative to population status. Consistent with the 1989 preamble for NMFS' implementing regulations (54 FR 40338; September 29, 1989), the impacts from other past and ongoing anthropogenic activities are incorporated into this analysis via their impacts on the environmental baseline (*e.g.*, as reflected in the regulatory status of the species, population size and growth rate where known, ongoing sources of human-caused mortality, or ambient noise levels).

To avoid repetition, the discussion of our analyses applies to all the species listed in Table 9 for which we authorized take, other than CIBWs, as the anticipated effects the POAs activities on marine mammals are expected to be relatively similar in nature. For CIBWs, there are meaningful differences in anticipated individual responses to activities, impact of expected take on CIBWs, or impacts on habitat; therefore, we provide a supplemental analysis for CIBWs, independent of the other species for which we authorize take.

NMFS has identified key factors which may be employed to assess the level of analysis necessary to conclude whether potential impacts associated with a specified activity should be considered negligible. These include (but are not limited to) the type and magnitude of taking, the amount and importance of the available habitat for the species or stock that is affected, the duration of the anticipated effect to the species or stock, and the status of the species or stock. The following factors support negligible impact determinations for the affected stocks of humpback whales, killer whales, harbor porpoise, harbor seals, and Steller sea lions. The potential effects of the specified actions

on these species are discussed above. Some of these factors also apply to CIBWs; however, a more detailed analysis for CIBWs is provided below.

- No takes by mortality or serious injury are anticipated or authorized;
- The number of total takes (by Level A and Level B harassment) are less than 2 percent of the best available abundance estimates for all stocks;
- Take will not occur in places and/or times where take would be more likely to accrue to impacts on reproduction or survival, such as within ESA-designated or proposed critical habitat, biologically important areas (BIA), or other habitats critical to recruitment or survival (*e.g.*, rookery);
- Take will occur over a short timeframe (*i.e.,* up to 21 total hours spread over nine to 24 non-consecutive days), and will be limited to the short duration a marine mammal would likely be present within a Level B harassment zone during pile driving. This short timeframe minimizes the probability of multiple exposures on individuals, and any repeated exposures that do occur are not expected to occur on sequential days, decreasing the likelihood of physiological impacts caused by chronic stress or sustained energetic impacts that might affect survival or reproductive success;
- Any impacts to marine mammal habitat from pile driving (including to prey sources as well as acoustic habitat, *e.g.*, from masking) are expected to be temporary and minimal; and
- Take will only occur within upper Cook Inlet—a limited, confined area of any given stock's home range.

For CIBWs, we further discuss our negligible impact findings in the context of potential impacts to this endangered stock. As described in the Recovery Plan for the CIBW (NMFS, 2016a), NMFS determined the following physical or biological features are essential to the conservation of this species: (1) Intertidal and subtidal waters of Cook

Inlet with depths less than 30 feet mean lower low water (9.1 m) and within 5 mi (8 km) of high and medium flow anadromous fish streams; (2) Primary prey species consisting of four species of Pacific salmon (Chinook, sockeye, chum, and coho), Pacific eulachon, Pacific cod, walleye pollock, saffron cod, and yellowfin sole, (3) Waters free of toxins or other agents of a type and amount harmful to CIBWs, (4) Unrestricted passage within or between the critical habitat areas, and (5) Waters with in-water noise below levels resulting in the abandonment of critical habitat areas by CIBWs. The SFD will not impact essential features 1-3 listed above. All construction will be done in a manner implementing best management practices to preserve water quality, and no work will occur around creek mouths or river systems leading to prey abundance reductions. In addition, no physical structures will restrict passage; however, impacts to the acoustic habitat are of concern. Previous marine mammal monitoring data at the POA demonstrate CIBWs indeed pass by the POA during pile driving (*e.g.*, 61 North Environmental, 2021). As described above, there was no significant difference in CIBW sighting rate with and in the absence of pile driving (Kendall and Cornick, 2015). However, CIBWs do swim faster and in tighter formation in the presence of pile driving (Kendall and Cornick, 2015).

Previously there has been concern that exposure to pile driving at the POA could result in CIBWs avoiding Knik Arm and thereby not accessing the productive foraging grounds north of POA such as Eagle River flats based on the specified project and mitigation measures—thus, impacting essential feature number five above (85 FR 19294; April 6, 2020). Although the data previously presented demonstrate whales are not abandoning the area (*i.e.*, no significant difference in sighting rate with and without pile driving), results of a recent expert elicitation (EE) at a 2016 workshop, which predicted the impacts of noise on CIBW survival and reproduction given lost foraging opportunities, helped to inform our assessment of impacts on this stock. The 2016 EE

workshop used conceptual models of an interim population consequences of disturbance (PCoD) for marine mammals (NRC, 2005; New *et al*., 2014, Tollit *et al*., 2016) to help in understanding how noise-related stressors might affect vital rates (survival, birth rate and growth) for CIBW (King *et al*., 2015). NMFS (2015, section IX.D—CI Beluga Hearing, Vocalization, and Noise Supplement) suggests that the main direct effects of noise on CIBW are likely to be through masking of vocalizations used for communication and prey location and habitat degradation. The 2016 workshop on CIBWs was specifically designed to provide regulators with a tool to help understand whether chronic and acute anthropogenic noise from various sources and projects are likely to be limiting recovery of the CIBW population. The full report can be found at *http://www.smruconsulting.com/publications/* with a summary of the expert elicitation portion of the workshop below.

For each of the noise effect mechanisms chosen for expert elicitation, the experts provided a set of parameters and values that determined the forms of a relationship between the number of days of disturbance a female CIBW experiences in a particular period and the effect of that disturbance on her energy reserves. Examples included the number of days of disturbance during the period April, May, and June that would be predicted to reduce the energy reserves of a pregnant CIBW to such a level that she is certain to terminate the pregnancy or abandon the calf soon after birth, the number of days of disturbance in the period April-September required to reduce the energy reserves of a lactating CIBW to a level where she is certain to abandon her calf, and the number of days of disturbance where a female fails to gain sufficient energy by the end of summer to maintain themselves and their calves during the subsequent winter. Overall, median values ranged from 16 to 69 days of disturbance depending on the question. However, for this elicitation, a "day of disturbance" was defined as any day on which an animal loses the ability to forage for at least one tidal cycle (*i.e*., it forgoes 50-100 percent of its energy intake on that day). The day of disturbance considered in the context of the report

is notably more severe than the Level B harassment expected to result from these activities, which as described is expected be comprised predominantly of temporary modifications in the behavior of individual CIBWs (*e.g.*, faster swim speeds, more cohesive group structure, avoidance, and increased foraging). Also, NMFS anticipates and has authorized 24 instances of takes, with the instances representing disturbance events within a day – this means that either 24 different individual beluga whales are disturbed on no more than one day each, or some lesser number of individuals may be disturbed on more than one day, but with the product of individuals and days not exceeding 24. Given the overall anticipated take, it is very unlikely that any one beluga will be disturbed on more than a few days. Further, the mitigation measures NMFS has prescribed for the SFD project are designed to avoid the potential that any animal will lose the ability to forage for one or more tidal cycles. While Level B harassment (behavioral disturbance) is authorized, our mitigation measures will limit the severity of the effects of that Level B harassment to behavioral changes such as increased swim speeds, tighter group formations, and cessation of vocalizations, not the loss of foraging capabilities. Regardless, this elicitation recognized that pregnant or lactating females and calves are inherently more at risk than other animals, such as males. NMFS first considered proposing the POA shutdown based on more vulnerable life stages (*e.g.*, calf presence) but ultimately determined all CIBWs warranted pile driving shutdown to be protective of potential vulnerable life stages, such as pregnancy, that could not be determined from observations, and to avoid more severe behavioral reaction.

Monitoring data from the POA suggest pile driving does not discourage CIBWs from entering Knik Arm and travelling to critical foraging grounds such as those around Eagle Bay. As previously described, sighting rates were not different in the presence or absence of pile driving (Kendall and Cornick, 2015). In addition, large numbers of CIBWs continued to use Knik Arm in 2020 during the duration of the PCT Phase 1

construction project (61 North Environmental, 2021). These findings are not surprising as food is a strong motivation for marine mammals. As described in Forney *et al*. (2017), animals typically favor particular areas because of their importance for survival (*e.g.,* feeding or breeding), and leaving may have significant costs to fitness (reduced foraging success, increased predation risk, increased exposure to other anthropogenic threats). Consequently, animals may be highly motivated to maintain foraging behavior in historical foraging areas despite negative impacts (*e.g.*, Rolland *et al*., 2012). Previous monitoring data indicates CIBWs are responding to pile driving noise, but not through abandonment of critical habitat, including primary foraging areas north of the port. Instead, they travel faster past the POA, more quietly, and in tighter groups (which may be linked to the decreased communication patterns). During PCT Phase 1 construction monitoring, no definitive behavioral reactions to the in-water activity or avoidance behaviors were documented in CIBW. Little variability was evident in CIBW behaviors recorded by PSOs from month to month, or between sightings that coincided with in-water pile installation or removal and those that did not (61 North Environmental, 2021). Of the 245 CIBWs groups sighted during PCT Phase 1 construction monitoring, seven groups were observed during or within minutes of in-water impact pile installation and 37 groups were observed during or within minutes of vibratory pile installation or removal (61 North Environmental, 2021). During impact installation, three of these groups of CIBWs showed no reaction, three showed a potential reaction, and one group continued moving towards impact pile installation. Of the 37 vibratory events monitored, nine groups of CIBWs displayed a potential reaction, 16 displayed no reaction, and 12 continued a trajectory towards the PCT (61 North Environmental, 2021). In general, CIBWs were more likely to display no reaction or to continue to move towards the PCT during pile installation and removal. In the situations during which CIBWs showed a possible reaction (three groups during impact driving and nine groups during vibratory

driving), CIBWs were observed either moving away immediately after the pile driving activities started or observed increasing their rate of travel. This traveling behavior past the POA has also been verified by acoustic monitoring. Castellote *et al*. (2020) found low echolocation detection rates in lower Knik Arm indicating CIBWs moved through that area relatively quickly when entering or exiting the Arm. We anticipate that disturbance to CIBWs will manifest in the same manner when they are exposed to noise during the SFD project: whales move quickly and silently through the area in more cohesive groups. We do not believe exposure to elevated noise levels during transit past the POA has adverse effects on reproduction or survival as the whales continue to access critical foraging grounds north of the POA, and tight associations help to mitigate the potential for any contraction of communication space for a group. We also do not anticipate that CIBWs will abandon entering or exiting Knik Arm, as this is not evident based on previous years of monitoring data (*e.g*., Kendall and Cornick, 2015; 61 North Environmental, 2021), and the pre-pile driving clearance mitigation measure is designed to further avoid any potential abandonment. Finally, as described previously, both telemetry (tagging) and acoustic data suggest CIBWs likely stay in upper Knik Arm for several days or weeks before exiting Knik Arm. Specifically, a CIBW instrumented with a satellite link time/depth recorder entered Knik Arm on August 18th and remained in Eagle Bay until September 12th (Ferrero *et al*., 2000). Further, a recent detailed re-analysis of the satellite telemetry data confirms how several tagged whales exhibited this same movement pattern: whales entered Knik Arm and remained there for several days before exiting through lower Knik Arm (Shelden *et al*., 2018). This longer-term use of upper Knik Arm will avoid repetitive exposures from pile driving noise.

POA proposed and NMFS has prescribed mitigation measures to minimize exposure to CIBWs, specifically, shutting down pile driving if CIBWs are observed approaching the mouth of Knik Arm, shutting down pile driving should a CIBW

approach or enter the Level B harassment zone, stationing PSOs at Point Woronzof and Ship Creek, and not vibratory pile driving unattenuated battered piles during August or September (peak CIBW season). These measures are designed to ensure CIBWs will not abandon critical habitat and exposure to pile driving noise will not result in adverse impacts on the reproduction or survival of any individuals. The location of PSOs at Point Woronzof allows for detection of CIBWs and behavioral observations prior to CIBWs entering Knik Arm. Although NMFS does not anticipate CIBWs will abandon entering Knik Arm in the presence of pile driving with the required mitigation measures, these PSOs will be integral to identifying if CIBWs are potentially altering pathways they would otherwise take in the absence of pile driving. Finally, take by mortality, serious injury, or Level A harassment of CIBWs is not anticipated or authorized.

In summary and as described above, the following factors primarily support our determination that the impacts resulting from this activity are not expected to adversely affect the CIBWs through effects on annual rates of recruitment or survival:

- No mortality is anticipated or authorized;
- Area of exposure will be limited to habitat primarily used as a travel corridor. Data demonstrates Level B harassment manifests as increased swim speeds past the POA and tight group formations and not through habitat abandonment;
- No critical foraging grounds (*e.g.*, Eagle Bay, Eagle River, Susitna Delta) will be impacted by pile driving; and
- While animals could be harassed more than once, exposures are not likely to exceed more than a few per year for any given individual and are not expected to occur on sequential days; thereby, decreasing the likelihood of physiological impacts caused by chronic stress or masking.

We also considered our negligible impact analysis with respect to NMFS' technical report released in January 2020 regarding the abundance and status of CIBWs

(Shelden and Wade, 2019). As described in the marine mammal section, new analysis indicates the CIBW stock is smaller and declining faster than previously recognized. While this is concerning, NMFS continues to believe the taking authorized (allowed for the cases where shutdowns cannot occur in time to avoid Level B harassment take) will not impact the reproduction or survival of any individuals, much less the stock, and will thereby have a negligible impact. The monitoring measures (four stations each equipped with two PSOs simultaneously on watch at each station) are extensive, such that we find it unlikely whales will undetected. The mitigation measures reduce noise entering the water column (a benefit for all marine mammals) through the use of an unconfined bubble curtain. Further, the exposure risk to CIBWs is greatly minimized through the incorporation of in-bound and out-bound whale pre-pile driving clearance zones. Finally, should pile driving be occurring at the same time a whale is detected, pile driving will shut down prior to its entering the Level B harassment zone. All these measures, as well as other required measures such as soft-starts, greatly reduce the risk of animals not accessing important foraging areas north of the POA, which could result in impacts to individual fitness or annual rates of recruitment or survival. For these reasons, the new status of CIBWs does not ultimately change our findings with respect to the specified activities.

Based on the analysis contained herein of the likely effects of the specified activity on marine mammals and their habitat, and taking into consideration the implementation of the required monitoring and mitigation measures, NMFS finds that the total marine mammal take from the specified activity will have a negligible impact on all affected marine mammal species or stocks.

Small Numbers

As noted above, only small numbers of incidental take may be authorized under sections 101(a)(5)(A) and (D) of the MMPA for specified activities other than military

readiness activities. The MMPA does not define small numbers and so, in practice, where estimated numbers are available, NMFS compares the number of individuals taken to the most appropriate estimation of abundance of the relevant species or stock in our determination of whether an authorization is limited to small numbers of marine mammals. When the predicted number of individuals to be taken is fewer than one third of the species or stock abundance, the take is considered to be of small numbers. Additionally, other qualitative factors may be considered in the analysis, such as the temporal or spatial scale of the activities. For all stocks, the amount of taking is less than one-third of the best available population abundance estimate (in fact it is less than 9 percent for all stocks considered here; Table 9).

Based on the analysis contained herein of the specified activity (including the required mitigation and monitoring measures) and the anticipated take of marine mammals, NMFS finds that small numbers of marine mammals will be taken relative to the population size of the affected species or stocks.

Unmitigable Adverse Impact Analysis and Determination

In order to issue an IHA, NMFS must find that the specified activity will not have an "unmitigable adverse impact" on the subsistence uses of the affected marine mammal species or stocks by Alaskan Natives. NMFS has defined "unmitigable adverse impact" in 50 CFR 216.103 as an impact resulting from a specified activity that is likely to reduce the availability of the species to a level insufficient for a harvest to meet subsistence needs by either causing the marine mammals to abandon or avoid hunting areas, directly displacing subsistence users, or placing physical barriers between the marine mammals and the subsistence hunters. An "unmitigable adverse impact" can also result from a specified activity that cannot be sufficiently mitigated by other measures to increase the availability of marine mammals to allow subsistence needs to be met.

No subsistence use of CIBWs occurs and subsistence harvest of other marine mammals in upper Cook Inlet is limited to harbor seals. Steller sea lions are rare in upper Cook Inlet; therefore, subsistence use of this species is not common. However, Steller sea lions are taken for subsistence use in lower Cook Inlet. In 2013 and 2014, the Alaska Department of Fish and Game conducted studies to document the harvest and use of wild resources by residents of four tribal communities in Cook Inlet: Tyonek, Nanwalek, Port Graham, and Seldovia (Jones and Kostick, 2016). Tyonek is the community in closest proximity to Knik Arm while the other communities are located lower in Cook Inlet. The only marine mammal species taken by the Tyonek community was harbor seals (from the McArthur River Flats north to the Beluga River (Jones *et al*., 2015) south of Knik Arm) while communities lower in the inlet relied on harbor seals, Steller sea lions and sea otters (we note the sea otter is under the jurisdiction of the USFWS; therefore, it is not a part of our analysis).

The potential impacts from harassment on stocks that are harvested in Cook Inlet will be limited to minor behavioral changes (*e.g.*, increased swim speeds, changes in dive time, temporary avoidance near the POA, etc.) within the vicinity of the POA. Some PTS may occur; however, the shift is likely to be slight due to the implementation of mitigation measures (*e.g.*, shutdown zones) and the shift will be limited to lower pile driving frequencies which are on the lower end of phocid and otariid hearing ranges. In summary, any impacts to harbor seals will be limited to those seals within Knik Arm (outside of any hunting area) and the very few takes of Steller sea lions in Knik Arm will be far removed in time and space from any hunting in lower Cook Inlet.

Finally, we have not received any communication from Alaska Natives that this project raises concern regarding their subsistence use. The POA alerted 14 tribal organizations and communities to the notice of the proposed IHA. No tribes commented

on or expressed concern over subsistence use during the public comment period for the proposed IHA.

Based on the description of the specified activity, the measures described to minimize adverse effects on the availability of marine mammals for subsistence purposes, and the required mitigation and monitoring measures, NMFS has determined that there will not be an unmitigable adverse impact on subsistence uses from the POA's specified activities.

Endangered Species Act

Section 7(a)(2) of the Endangered Species Act of 1973 (ESA: 16 U.S.C. 1531 *et seq*.) requires that each Federal agency insure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of designated critical habitat. To ensure ESA compliance for the issuance of IHAs, NMFS consults internally whenever we propose to authorize take for endangered or threatened species, in this case with the Alaska Region Protected Resources Division Office.

There are two marine mammal species (CIBWs and western DPS Steller sea lions) with confirmed occurrence in the project area that are listed as endangered under the ESA. The NMFS Alaska Regional Office Protected Resources Division issued a BiOp on August 9, 2021, under section 7 of the ESA, on the issuance of an IHA to the POA under section 101(a)(5)(D) of the MMPA by the NMFS Permits and Conservation Division. The BiOp concluded that the specified action is not likely to jeopardize the continued existence of CIBWs or western DPS Steller sea lions, and is not likely to destroy or adversely modify CIBW critical habitat. There is no critical habitat designated for humpback whales or Steller sea lions in the action area.

National Environmental Policy Act

NMFS prepared an EA and analyzed the potential impacts to marine mammals that will result from the POA SFD construction project. This EA was made available to the public for review during the public comment period of the proposed IHA; we did not receive any comments from the public relevant to the EA. A Finding of No Significant Impact (FONSI) was signed on August 10, 2021. A copy of the EA and FONSI is available upon online at *https://www.fisheries.noaa.gov/permit/incidental-take-authorizations-under-marine-mammal-protection-act*.

Authorization

NMFS has issued an IHA to the POA or the potential harassment of small numbers of six marine mammal species incidental to the SFD project in Knit Arm, Alaska, provided the previously mentioned mitigation, monitoring and reporting requirements are followed.

Dated: August 31, 2021.

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Kimberly Damon-Randall,

Director, Office of Protected Resources,

National Marine Fisheries Service.

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